Printer Applicator System

PAM 3600

Service Manual

Edition 1/07

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All specifications about delivery, design, performance and weight are given to the best of our current knowledge and are subject to change without prior notice.

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1 Introduction

1.1 Scope of Information

This manual is intended for use by qualified service and maintenance personnel.
The technical information included relates to hardware and mechanical parts of the Printer Applicator System PAM 3600.

Information related to operation will be found in the Operator's Manual.

If a problem occurs, which cannot be solved with the help of this manual, please contact the Technical Service Department.

To adress see page 2.

1.2 Important Information

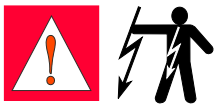
Important information contained in this manual is marked as follows:

WARNING!
Impending danger!
May cause death or physical injuries.

CAUTION!
Dangerous situation!
May cause equipment/material damage or data loss.

NOTICE!
Helpful additional information and tips for use.

In special cases a second symbol is additionally used to characterize the kind of danger.
See a sample for the risk of electric shock:

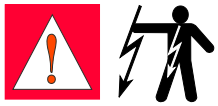


WARNING!
Mortal danger by electric shock!
Unplug power cord before opening the cover!

1.3 General Safety Instructions

Follow the general safety rules below:

- Keep the area around the device clean at all times!
- Avoid performing maintenance which might expose persons to danger or make the device a source of danger!
- Keep housing or other parts of the device removed in a safe place during maintenance!
- Keep tools out of the way to avoid injury to yourself or others not involved in the maintenance!
- Do not wear loose clothing that could be caught in moving parts of the device. Button up your shirt or jacket sleeves or roll them up. Tie back or put up long hair. Tuck the ends of scarves, ties and shawls into your clothing and attach them with a non-conducting clip.
- Do not wear jewelry, glasses with metal frame or clothing with metal fasteners!



WARNING!
Mortal danger by electric shock!
If such metal parts contact the device, they cause an increased current flow due to good conductivity!

- Wear protective goggles at work as follows:
  - while driving pins or similar parts in or out with a hammer,
  - while working at an electric drilling machine,
  - while using spring hooks or springs,
  - while releasing or using of springs, snap rings and grip rings,
  - while soldering,
  - while using solvents, cleansers or other chemical substances,
  - in any case where injury to the eyes is possible.
- Refit all protective devices such as covers, safety instructions, and grounding cable upon completion of the maintenance work!
  Replace all faulty or defective parts!

1.4 Safe Handling of Electricity

Follow the additional instructions below when handling electricity:

- Find out the positions of the emergency and the power switch in order to operate them quickly in an emergency situation!
- Do not work alone under dangerous working conditions or while working on devices with non-protected voltages (over 50 V AC or 120 V DC)!
- Turn off power to the printer before:
  - removing or installing power units,
  - working in the immediate vicinity of open power supply parts,
  - mechanical checkup of power supply parts,
  - changing circuit boards or electrical parts.
- If you cannot avoid working on devices with non-protected voltages, follow these safety precautions:
  - Have a person nearby who is aware of the position and operation of the power switches, who will switch off the power in case of danger.
  - Use only tools and test devices, which are suitable for the work being done.
  - Work only with one hand on devices that are switched on. Keep the other hand behind your back or in your pocket until you have finished.

NOTICE!
A shock occurs only with a closed circuit. By using only one hand, as described above, you would avoid a current flow through your own body.

- Do not use worn or defective tools!
- Never assume that a circuit is not powered. Always verify that there is no voltage present!
- Always examine the work area for possible sources of danger, such as wet floors, defective extension cords, faulty protective grounding connectors etc.
- If you observe an accident with electricity:
  - **Be careful and avoid danger to yourself.**
  - **Switch off power.**
  - **Request medical assistance.**
  - **Give first aid if necessary.**

1.5 Printer Types

There are two printers for the PAM 3600 systems available:

- PAM 3630 with a printhead resolution of 300 dpi and
- PAM 3660 with a printhead resolution of 600 dpi.

Both printers can be equipped with one of the applicator types

- PAM 3602, tamp-blow applicator with vertical lift (main) cylinder and turn cylinder and
- PAM 3603, tamp-blow applicator with vertical lift (main) cylinder and horizontal lift cylinder.

1.6 Component Location

Printer

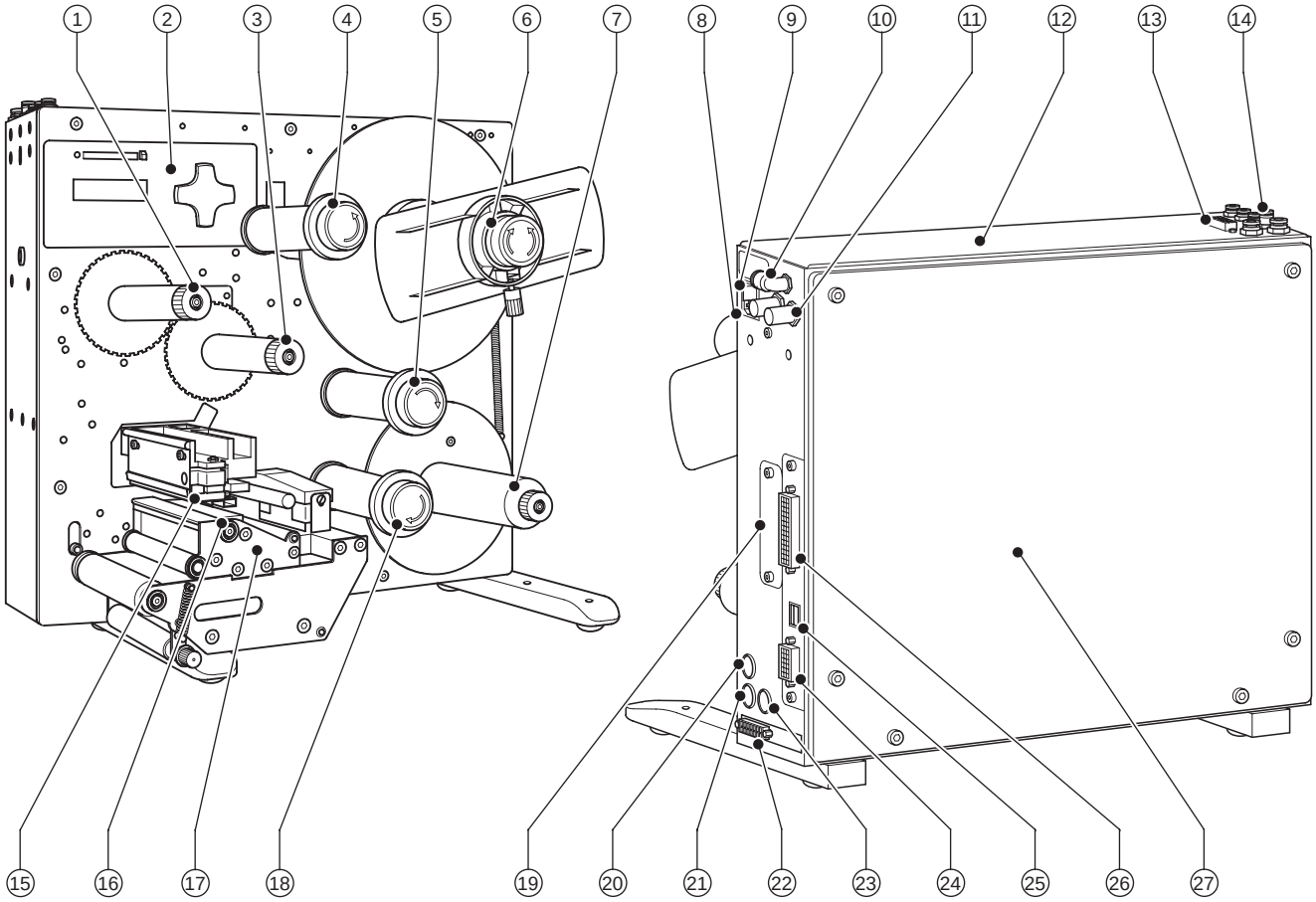
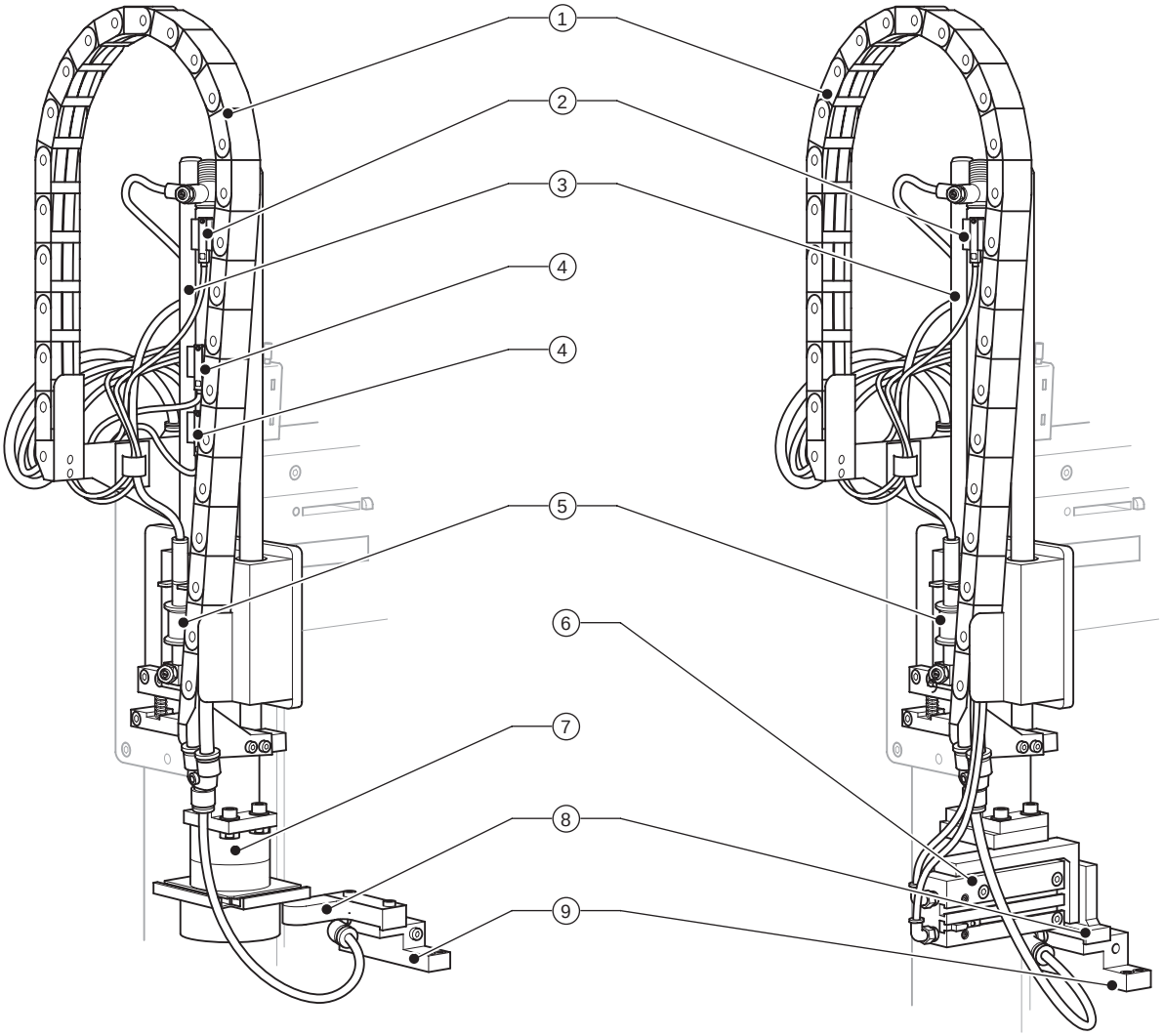


Figure 1a Overview printer

1 Ribbon take up hub
2 Control panel and display
3 Ribbon supply hub
4 Swing arm with guide roller
5 Guide roller
6 Media supply hub
7 Internal rewinder
8 Power connector
9 Power switch
10 Compressed air connector
11 Silencers
12 Frame
13 Sensor connector for the applicator
14 Compressed air connectors for the applicator
15 Printhead
16 Print roller
17 Peel-off table
18 Guide roller
19 Slot for an additional interface card
20 Connector warning sensor ribbon end
21 Connector warning sensor label end
22 PLC interface port
23 Connector warning light
24 RS-232 interface
25 USB master interface
26 Bi-directional parallel interface
27 Cover

Applicators



PAM 3602 **PAM 3603**

Figure 1b Overview applicators

1 Energy-chains
2 Sensor 1 main cylinder
3 Main cylinder
4 Sensor 2 main cylinder (PAM 3602 only)
5 Slide valve
6 Lift cylinder (PAM 3603 only)
7 Turn cylinder (PAM 3602 only)
8 Pad holder
9 Pad

Options

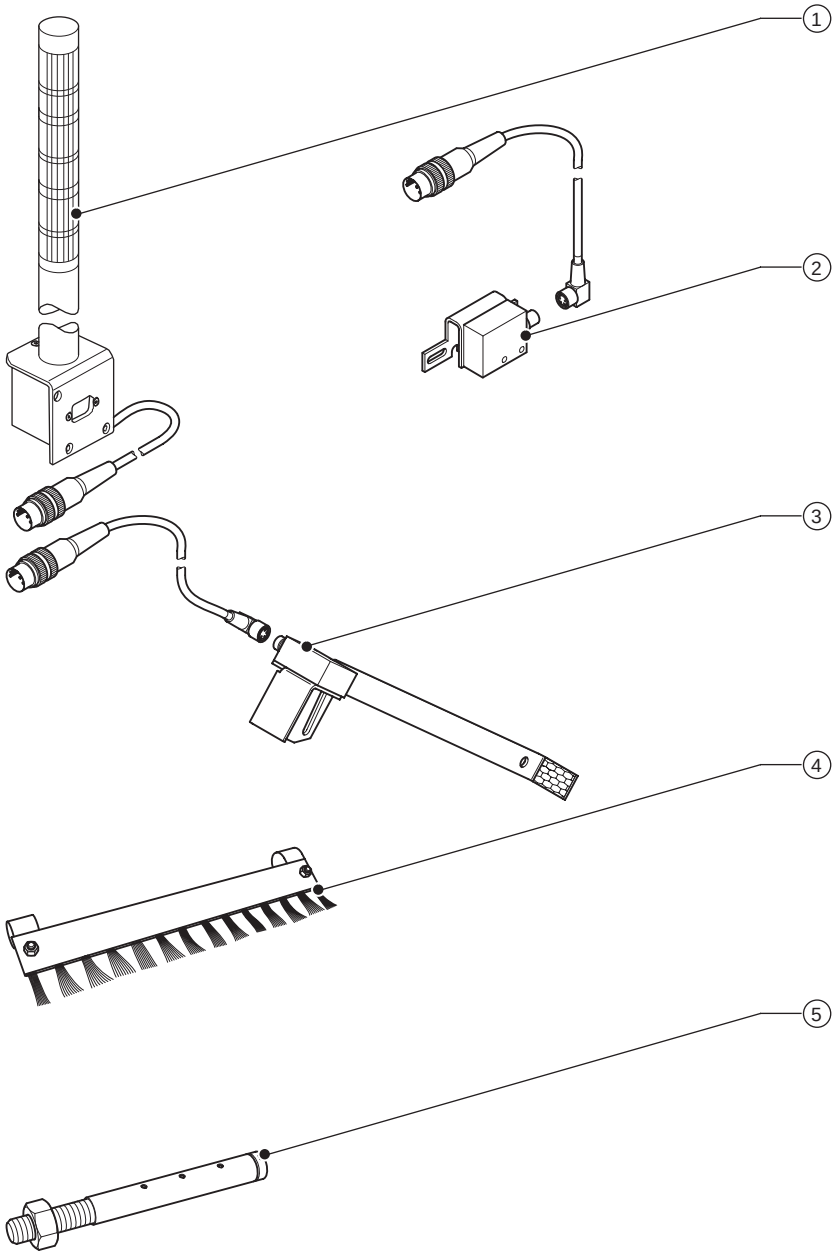


Figure 1c Overview options

1 Warning light
2 Warning sensor, ribbon end
3 Warning sensor, label end
4 Antistatic burst
5 Blow tube

2 Expanded Functions for Servicing

2.1 The Service Key and the OEM Key

There are a service key (Part No. 5540301) and an OEM key (Part No. 5540304) for accessing special service functions which are not accessible to the operator.

The OEM key enables:

- selecting the correct device name (Set OEM Name).

The service key enables, among other functions:

- adjustment of the label edge sensor,
- clearing the service counters,
- printing an expanded status report,
- printing an event log,
- saving the configuration data on a memory module (Save NVRAM),
- loading the configuration data from a memory module (Load NVRAM).

Moreover, the configuration parameters stored in the printer for optional components (interface boards) are also accessible with the service key inserted, even if they are not currently installed.
The information contained in the test printout is also expanded.
The printer offers the option of protecting certain functions - such as the complete printer configuration and security-relevant memory module functions - from unauthorized access by means of a code number (PIN). There is no PIN prompt when accessing the stated functions with the service key inserted, i. e. the protective function is circumvented.

NOTICE!
Please ask your cab dealer about obtaining the service key or the OEM key.

Insert the respective key (1) into the USB master interface (2) on the side of the printer. This can be done while the device is switched on.

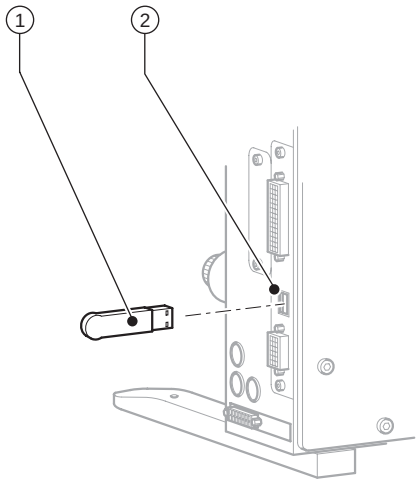


Figure 2a Inserting the service key or the OEM key

1 Key
2 USB master interface

2.2 Expanded Functions in the "Setup" Menu

There are a variety of parameters that can be set to configure the printer to specific requirements.

There are three different methods to set the parameters of the Printer Configuration:

- Configuration via the control panel (see Operator's Manual),
- Configuration via the optional Ethernet interface accessing the internal web server of the printer using a Java enabled browser (see Operator's Manual of the optional Ethernet interface),
- Configuration via immediate commands (described in the Programming Manual, chapter "Immediate Commands").

Print Parameters

Protocol Error

With the service key inserted, the parameter "Protocol error" is accessible in the "Print parameters" submenu.

The protocol error parameter is "ON" in the standard setting. As a result, the printer switches to the error state after receiving unknown or faulty data.

When working with older computer operating systems, it may happen that the operating system's print spooler sends normal printer status messages (e.g. end of paper) back to the printer as ASCII text.

The printer cannot interpret this data and produces a long series of protocol errors. The protocol error display can be switched off in such a case.

CAUTION!
Data loss!
Protocol errors arising from faulty programming are also ignored in the "OFF" setting. There is a risk of losing data.

1. Insert the service key into the Master USB socket.
2. Switch from online mode to the offline menu by pressing the MODE key.
3. Press the ↑ or ↓ key until you reach the "Setup" menu, and then press the ↵ key.
4. Now select the "Print parameters" submenu and then the "Protocol error" parameter, then press the ↵ key.
5. Set the parameter according to your requirements.

Interfaces

The following parameters can be called or configured in the "Interfaces" submenu:

- Character set,
- IEEE1284,
- RS-232.

If the optional interfaces

- RS-422/485,
- Ethernet and
- Keyboard

are installed then these are also shown for setting.

NOTICE!
The parameters of the options "RS-422/485 interface", "Ethernet interface" and "Keyboard" can be accessed with the service key, even if these components are not present.

Please refer to the "Printer Configuration" section of the printer or optional component operator's manuals for instructions on how to perform the configuration and set the parameters.

2.3 Expanded Functions in the "Test" Menu

The test functions allow the operator or the service personnel to obtain an overview of the most important printer settings and hardware configurations.

The following functions can be called in the "Test" menu.

- Short status*
- Status print
- Font list*
- Device list
- ASCII dump mode*
- Test grid*
- Label profile
- Printhead profile
- Event log
- IFFS Print directory

NOTICE!
For functions marked with an * refer to the Operator's Manual. You will find all the information you need there.
Additional information to the Operator's Manual about the other test functions you will find in this section.

In order to reach the "Test" submenu, use the MODE key to switch from online mode to the offline menu.
Press the ↑ or ↓ key until you reach the "Test" menu, and then press the ↵ key.
Now select the desired test function.

Status Print

The status print contains information about the printer configuration and the status.
It will be printed with the heat level and the print speed set in the "Setup" menu.

NOTICE!
With the service key inserted, the status print also contains parameter settings of optional components, even if these have not been installed and the values of the service counters.

You obtain the expanded status print as follows:

1. Insert the service key into the Master USB socket.
2. Switch from online mode to the offline menu by pressing the MODE key.
3. Press the key ↑ or ↓ until you reach the "Test" menu, and then press the ↵ key.
4. Select the "Status print" function with the ↑ or ↓ key and confirm with the ↵ key.
   Start the printout with the pre-dispense key.
   The printout can be aborted with the CANCEL key.

The status printout contains the following information:

A Device type, version and date of the firmware
B Values of selected configuration parameters
C Switch-on time, number of prints and the print length, values of the service counters
D Printhead temperature, heating voltage
E Details about the working points of the label edge sensor
F Line pattern for evaluating the quality of the printed image

O Parameter settings of optional components

A typical status printout is shown in the following figure.

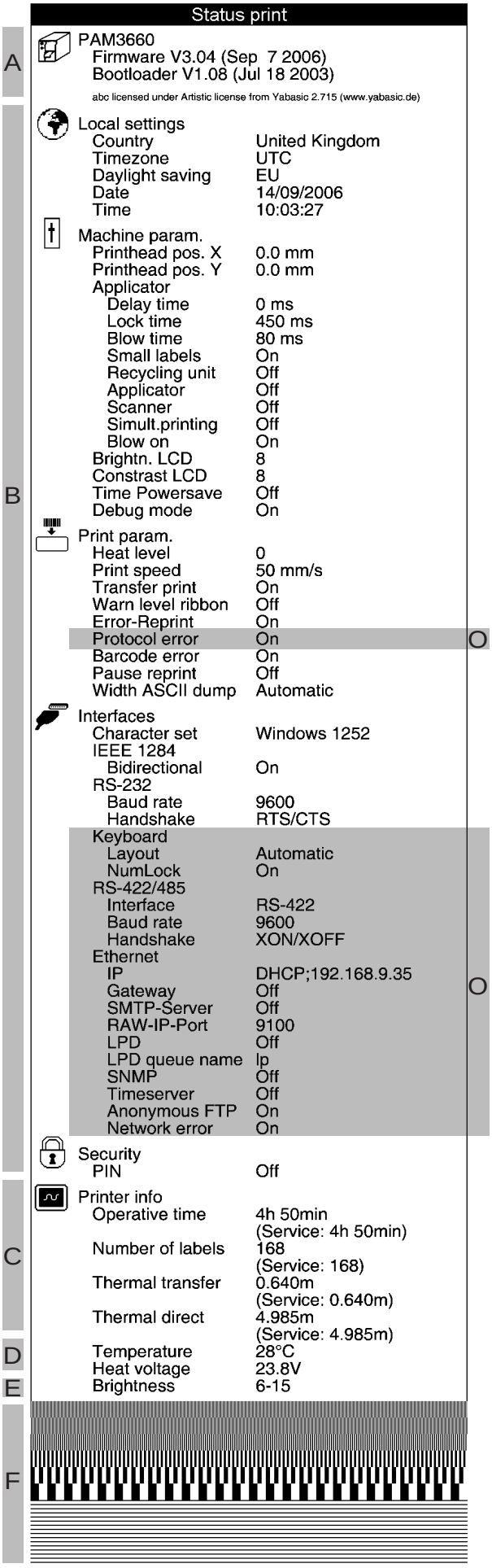


Figure 2b Status Print with Service Key inserted

Device List

The most important hardware components installed in the printer and the connected optional devices are listed in the "Device list" submenu.

Please also refer to the "Test Functions" section of the Operator's Manual for the printout of the device list and further information.

Proceed as follows to print the device list:

1. Insert the service key into the Master USB socket.
2. Switch from online mode to the offline menu by pressing the MODE key.
3. Press the ↑ or ↓ key until you reach the "Test" menu, and then press the ↵ key.
4. Select the "Device list" function with the ↑ or ↓ key and confirm with the ↵ key.
   Start the printout with the pre-dispense key.
   The printout can be aborted with the CANCEL key.

The printout contains the following information:

CPU	Type and serial number of the CPU PCB, revision number of the CPU PCB and FPGA
TPH	Resolution and number of hot points of the thermal printhead
CARD*	Capacity, manufacturer, serial number and version number of the FlashCard
SLOT*	Type, serial number and revision number of the interfaces expansion card
USB [a]* [b/c] s	Type and revision number of the installed USB devices a: Number of the USB device b: Number of the USB device to which device a is connected c: Port number of device b, to which device a is connected s: Speed of the USB device (Low Speed or Full Speed) **Only with inserted service key:** Mfr. Manufacturer ID indicates the manufacturer of the USB device Class Code number for the USB device class Protocol Code number for the type of communication with the USB device Phase Internal value for debugging purposes

(* This information is only printed if the corresponding devices are installed.)

Device list

PAM3660 - 14/09/2006 - 10:04:30
Firmware V3.04 (Sep 7 2006) - #138060935209

Name	Description
CPU	PAM3600, #138060935209
	PCB-Rev. 5, FPGA-Rev. 3
TPH	600 dpi, 2496 dots
CARD	15 MByte (SanDisk SDCFB-16)
	#243338G0812, vde 1.10
SLOT	USB Full-Speed
	#046125495647, Rev. 1.00
USB [1]	Generic/Generic Hub
[0] Full	Rev. 3.00
	Mfr: 03EB,Class: 09/00,Protocol: 00,Phase 20/0
USB [2]	cab/PamApplicator
[1/2] Low	Rev. 36.12
	Mfr: 0985,Class: FF/1D,Protocol: 00,Phase 20/2
USB [3]	cab/Frontpanel
[1/1] Full	Rev. 1.02
	Mfr: 0985,Class: FF/01,Protocol: 00,Phase 20/1
USB [3]	cab/CompactFlash
[1/1] Full	Rev. 1.02
	Mfr: 0985,Class: FF/02,Protocol: 00,Phase 20/8
USB [4]	Brady/Service-Key
[1/4] Low	#7-5037793,Rev. 1.05
	Mfr: 0985,Class: FF/00,Protocol: FF,Phase 20/4

Figure 2c Device List with Service Key inserted

Label Profile

The label profile printout contains additional information with the service key inserted.

Print out the label profile as follows:

1. Insert the service key into the Master USB socket.
2. Select the "Test" menu in the offline menu and confirm with the ↵ key.
3. Press the ↑ or ↓ key until you reach the "Label profile" function and confirm with the ↵ key.
   Start the printout with the pre-dispense key.
   The printout can be aborted with the CANCEL key.

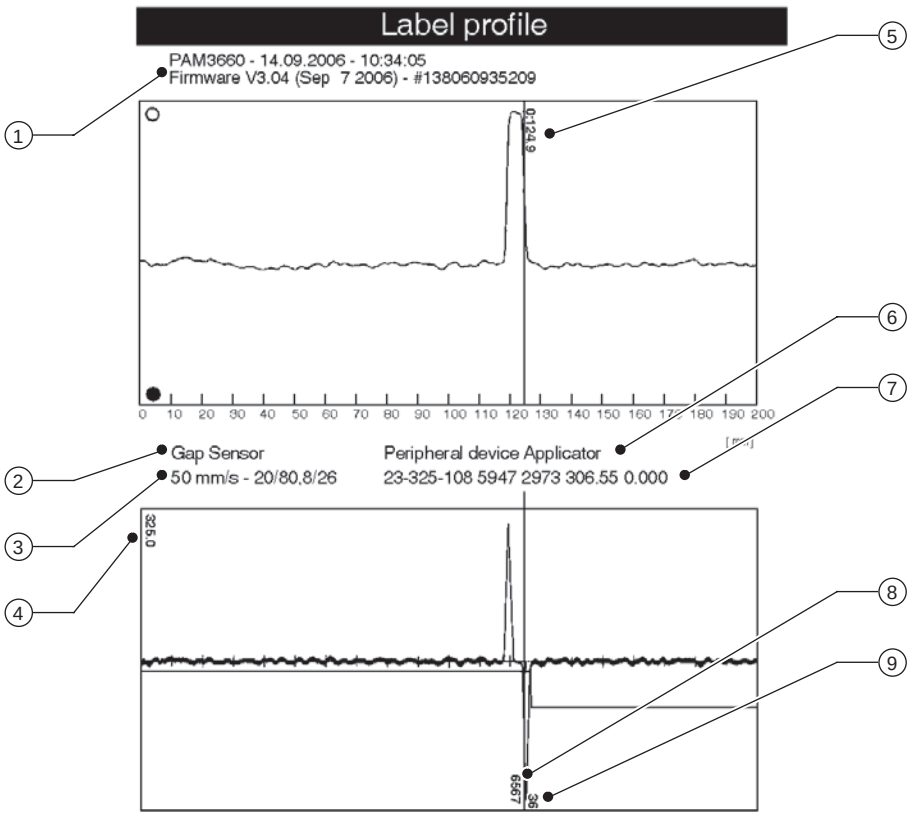


Figure 2d Label Profile with Service Key inserted

1 Device name and current firmware version
2 Method of label detection (transmitted light/reflex bottom)
3 Print speed and service information for adjusting the label sensor
4 Scale factor for the derivative diagram *
5 Coordinate in the direction of paper flow at which the label start was detected
6 Type of peripheral device connected
7 Information for the firmware developer
8 Stroke between start and end of the negative derivative *
9 Width of the negative derivative in motor increments *

Information marked with * are only available with the service key inserted.

Printhead Profile

When selecting the option "Printhead profile", a diagram will be printed which shows the resistance values for the single printhead dots. This printout makes it possible to see the status of the printhead.

When a dot is damaged or defective its resistance value increases. When this error occurs, it causes white lines in the print image from top to bottom. In some cases, the white line could cause an invalid scan of certain barcodes.

To print the printhead profile, load media (labels, continuous paper) and a transfer ribbon (if applicable), which extends over the entire print width of the printer.

NOTICE!
With "Printhead profile", the printer will not sense any label gaps, and will print non-stop. Continuous paper works best for the prints.

1. Insert the service key into the Master USB socket.
2. Switch from online mode to the offline menu by pressing the MODE key.
3. Select the "Test" menu in the offline menu and confirm with the ↵ key.
4. Select the option "Printhead profile" by pressing the ↑ key or the ↓ key and confirm by pressing the ↵ key.

NOTICE!
The measurement of the resistance values can take several minutes.
You will see the progress of this measurement on the display.

5. When the measurement has finished, start the printout by pressing the pre-dispense key.
6. The "Printhead profile" will be printed with the heat level and print speed set in the "Setup" menu.
   To cancel the print, press the CANCEL key.

The printout has a scale which marks the actual geometric position of the dots. The scale will be printed underneath the black bar with the text "Printhead profile". It is possible to compare a single dot to the scale as demonstrated in the following diagram.
The figure indicates a print image failure around 22.5 mm in the black bar. In the scale section of the diagram, a dot with an increased resistance value appears around 22.5 mm. Using this comparison makes it clear that the image fault on the top line is caused by a defective printhead and not a case of a dirty printhead surface.

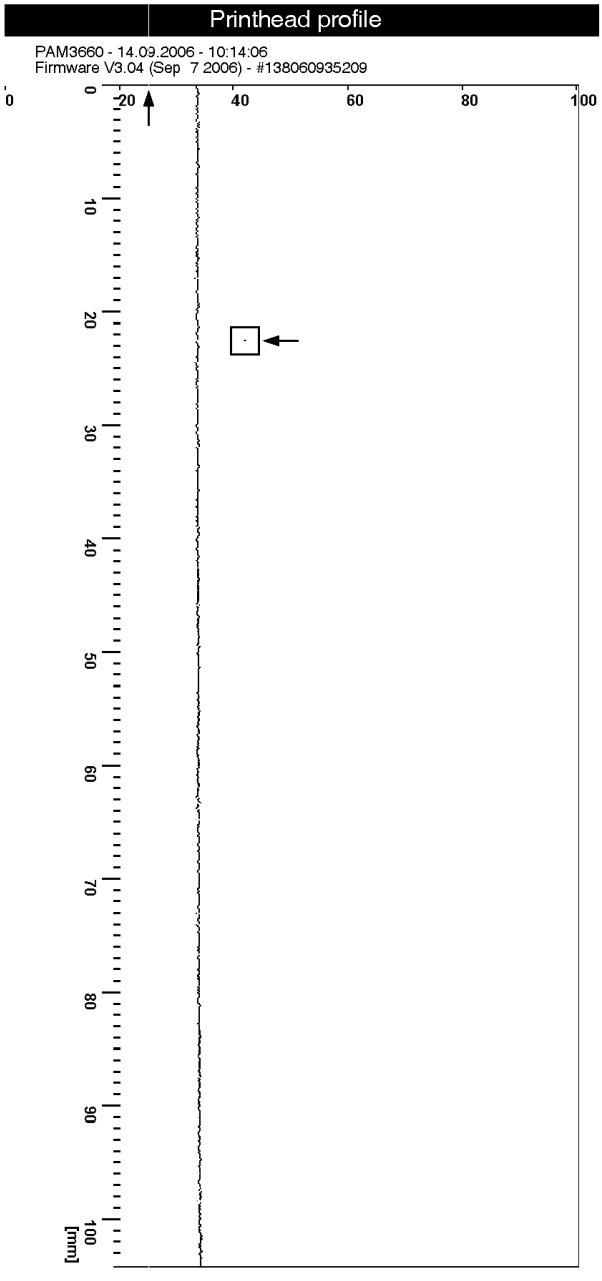


Figure 2e Printhead Profile with Service Key inserted

Event Log

The label printer stores the following events in the event log:

- Hardware fault
- Adjustment of the label sensor
- Firmware updates
- Service counters reset

The event log can only be called with the service key inserted.

Print out the event log as follows:

1. Insert the service key into the Master USB socket.
2. Select the "Test" menu in the offline menu and confirm with the ↵ key.
3. Press the ↑ or ↓ key until you reach the "Event log" function and confirm by pressing the ↵ key.
   Start the printout by pressing the pre-dispense key.
   The printout can be aborted with the CANCEL key.

Event log

PAM3660 - 14/09/2006 - 10:07:24
Firmware V3.04 (Sep 7 2006) - #138060935209
Bootloader V1.08 (Jul 18 2003)

Date/Time	Description
08/08/06/15:22:23	TPH -> 24dot/mm, 2496 dots
08/08/06/15:39:04	Firmware upd. (V3.03 Aug 20, 2006)
08/08/06/15:42:27	Adjust gap sensor: 8/27
09/08/06/08:15:07	Clear service counters
04/09/06/11:50:49	Firmware upd. (V3.04 Sep 4, 2006)
08/09/06/11:23:01	Firmware upd. (V3.04 Sep 7, 2006)
12/09/06/13:29:52	Adjust gap sensor: 8/25

Figure 2f Event log

Print Directory of IFFS

The IFFS (Internal Flash File System) is located on a Flash EPROM in the printer.

NOTICE!
As long as there was no write access on the IFFS the function "Print directory" is not shown.

The function "Print directory" can only be called with the service key inserted.

Start the printout of the directory as follows:

1. Insert the service key into the Master USB socket.
2. Select the "Test" menu in the offline menu and confirm with the ↵ key.
3. Press the ↑ or ↓ key until you reach the "Print directory" function and confirm by pressing the ↵ key.
   Start the printout by pressing the pre-dispense key.
   The printout can be aborted with the CANCEL key.

From the printout you can get the following information:

- First line: headline
- For each file in the IFFS one line is printed with information about file name, file type, size of file in byte, date and time for last change of file.
- Last line: free memory in IFFS

```
Directory of internal Flash:
DEFAULT         LBL     786     16.06.04 17:10
64718 bytes free
```

Figure 2g Printout Directory of IFFS

2.4 Expanded functions in the "Service" Menu

In the "Service" menu, the operator only has access to the "Firmware update" and "Firmware from card" function.
The following functions are available after the service key respective the OEM key have been inserted:

Firmware update

Firmware from card*

Clear service counter

Adjust gap sensor

Save NVRAM*

Load NVRAM*

Set OEM Name

Functions marked with * are only available if the CF memory card is installed.

Clearing the Service Counter

The printer has two counter sets, a total and a service counter. The following data is recorded in both counter sets:

Operative time: time the printer has been switched on
Number of labels: number of labels printed
Transfer print: length of material printed in transfer print
Thermal direct: length of material printed in direct thermal print

The total counter contains the values for the total elapsed service life of the printer. The values of the total counter are shown in both the short status and in the status printout.

The service counter can be reset with the use of the service key after major maintenance or repair work.

The service counter consequently provides information about the print output since the last reset.

The service counter is reset as follows:

1. Switch from online mode to the offline menu by pressing the MODE key.
2. Press the ↑ or ↓ key until you reach the "Service" menu, and then press the ↵ key.
3. Now select the "Clear service counter" function, and then press the ↵ key.
4. "No" appears in the display. Change the selection to "Yes" with ↑ or ↓ and press ↵ .
   This resets the service counter.

You can check the value reset in the status printout.

Adjusting the Label Edge Sensor

The function "Adjust gap sensor" enables the label edge sensor to be adjusted. This is necessary when the label edge sensor itself or the CPU PCB are replaced.

NOTICE!
In order to avoid the influence of light from the outside, check the adjustment of the sensor with the cover closed and housing mounted!

Perform the adjustment as follows:

1. Insert the service key into the Master USB socket.
2. Select the "Service" menu in the offline menu and confirm with the ↵ key.
3. Select the "Adjust gap sensor" function in the "Service" menu and confirm with the ↵ key.
4. Open the printhead.
5. The request "Please remove label stock" from label edge sensor appears in the display. Obey the request, close the printhead and confirm with the ↵ key.
6. The display now requests "Please insert liner" into the label edge sensor.
   Insert the liner material (without labels) into the label edge sensor, lock the printhead and confirm with the ↵ key.

NOTICE!
Ensure that there are not any labels on the liner in the vicinity of the label edge sensor. This would lead to a faulty alignment and a device malfunction.

7. "OK" appears in the display when the adjustment has been successful. Press the ↵ key again. The adjustment has been completed now.

The message "Error" appears in the display if a fault occurs during the adjustment. If a fault recurs when the adjustment is repeated, then there could be a defect in the following components:

- Label edge sensor,
- Label edge sensor connection cable or
- CPU PCB.

Saving the NVRAM

The "Save NVRAM" function is used to save a printer configuration on a CompactFlash memory module.

This function is only accessible with the service key inserted and the CF card in the slot.

Save on the NVRAM as follows:

The printer is switched on.

1. Insert a CF card into the CF slot.
2. Insert the service key into the Master USB socket.
3. Select the "Save NVRAM" function in the "Service" menu and press the ↵ key.
   "No" appears in the display.
4. Change the selection to "Yes" with ↑ or ↓ and press the ↵ key. The saving begins and is indicated by the green LED next to the CF slot.

CAUTION!
Data loss!
Do not press the ejection key for the CF card while the green LED is lit.

If an error message appears in the display, this may indicate an unreadable CF card (e.g. unknown card type, unformated card).

NOTICE!
To format the CompactFlash memory module, please refer to the "Memory Modules" section of the Operator's Manual.

Loading the NVRAM

The "Load NVRAM" function is used to reload a previously saved printer configuration from a CompactFlash memory module.

This function is only accessible with the service key inserted and the CF card in the slot.

Load the NVRAM as follows:

The printer is switched on.

1. Insert a CF card containing the stored printer configuration into the CF slot.
2. Insert the service key into the Master USB socket.
3. Select the "Load NVRAM" function in the "Service" menu and press the ↵ key.
   "No" appears in the display.
4. Change the selection to "Yes" with the ↑ or ↓ key, and press the ↵ key.
   The loading process begins and is indicated by the green LED next to the CF slot.

CAUTION!
Data loss!
Do not press the ejection key for the CF card while the green LED is lit.

5. "OK" appears in the display when the loading process has finished. Press the ↵ key again.

An error message appears in the display if a fault occurred during the loading process.

In this case, try to repeat the loading process.

If an error occurs again, you have to reset the configuration parameters of the printer individually.

Setting the Device Name

The "Set OEM Name" function is used to adapt the CPU PCB to operating in the actual printer, because the CPU PCB is qualified for several printer types. This adjustment is necessary after replacing the CPU PCB to detect exactly the printer type over the interfaces.

This function is only accessible with the OEM key inserted.

1. Insert the OEM key into the Master USB socket.
2. Select the "Set OEM Name" function in the "Service" menu and press the ↵ key.
3. Select the device name with the ↑ or ↓ key.
4. Confirm the selection by pressing the ↵ key.

3 Maintenance

The printer requires little maintenance.

It is important to clean the thermal printhead regularly. This guarantees a consistently good printed image and plays a major part in preventing premature wear of the printhead.

Otherwise, the maintenance work is limited to occasion cleaning of the device and the rollers.

3.1 General Cleaning

Dust particles collect during operation, particularly around the printer's mechanical parts.

Remove this dust with a soft brush or vacuum cleaner.

The outer surface of the printer may be cleaned with an all-purpose cleanser.

CAUTION!
Material damage!
Do not use abrasive cleansers or solvents!

3.2 Cleaning the Printhead

After extensive printer operation or if poor quality paper or ribbon has been used, foreign particles may collect on the printhead. They cause characters or bar codes to appear light or faded, and can cause continuous light streaks to always appear in the same physical position.
When this happens, you must clean the printhead.
We recommend cleaning the printhead every time changing the ribbon.

To clean the printhead, proceed as follows:

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

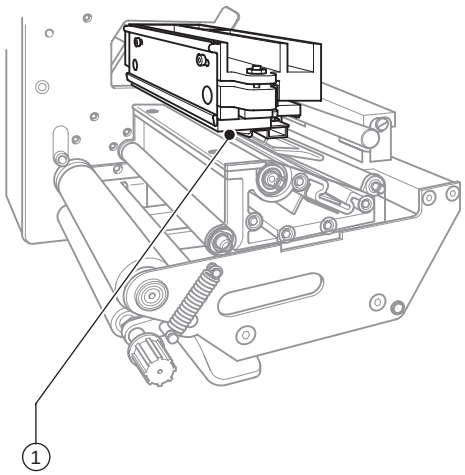


Figure 3a Cleaning the printhead

1 Print surface

1. Remove label stock and transfer ribbon from the printer.
2. Remove the dirt and adhesive from the print surface (1) of the printhead using a cleaning pen.

CAUTION!
Material damage!
Do not use any sharp objects to clean the print surface!

3. Allow the printhead to dry for 2 - 3 minutes.

3.3 Cleaning the Print Roller and the Transport System

If the print roller and the rollers of the transport system become contaminated with dirt, label adhesive, ink or rest of labels, the movement of the media and print quality may also be adversely affected.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

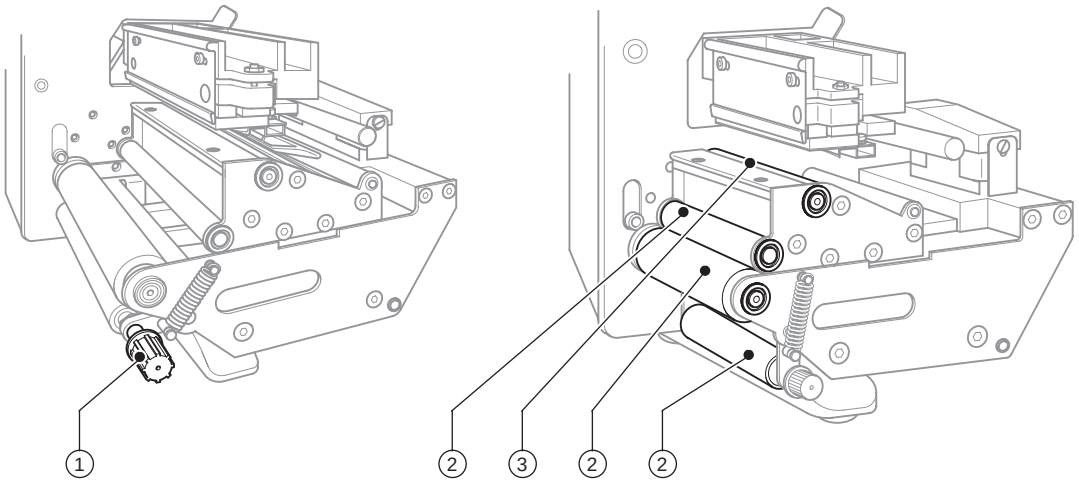


Figure 3b Cleaning the transport rollers and the print roller

1 Knurled knob
2 Roller
3 Print roller

1. Remove label stock and transfer ribbon from the printer.
2. Unlock the transport locking roller by pressing the knurled knob (1) downward.
3. Using a clean cloth and isopropyl alcohol, wipe off any accumulated dirt from the rollers (2) of the transport system and from the print roller (3).
4. Lock the transport locking roller.

3.4 Cleaning the Brake

It is recommended to clean the brake regularly. Otherwise it is possible that the transport of the paper is adversely affected.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

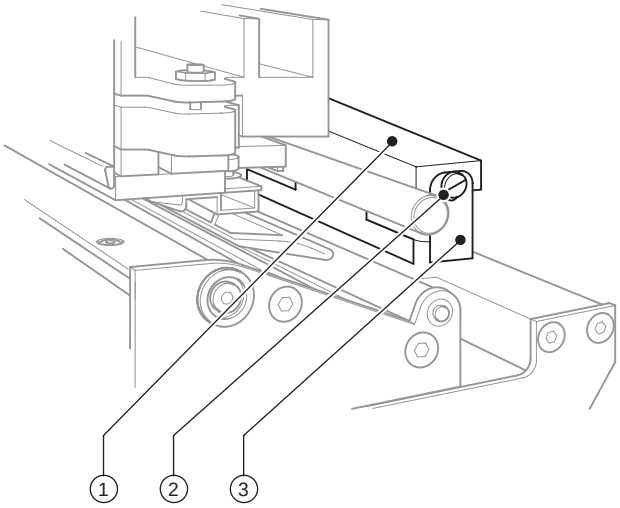


Figure 3c Cleaning the brake

1 Brake
2 Screw
3 Brake plate

1. Remove label stock and transfer ribbon from the printer.
2. Loosen the screw (2).
3. Remove the brake plate (3).
4. Using a soft brush or a vacuum cleaner, wipe off any accumulated dirt from the area around the brake (1).
5. Remount the brake plate (3) and tighten the screw (2).

3.5 Cleaning the Pad

During operation, dust particles accumulate on the pad. It is recommended to clean the pad regularly.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

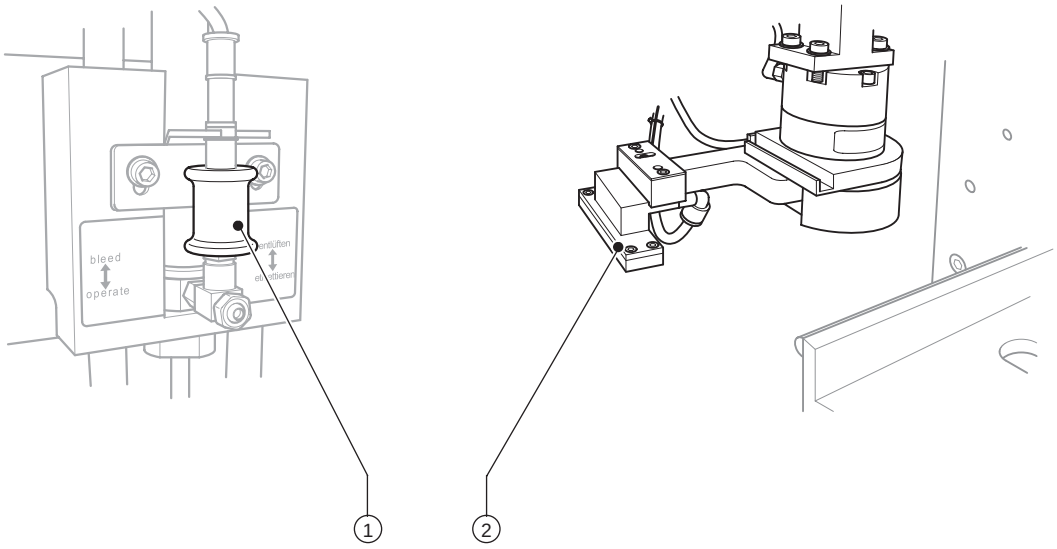


Figure 3d Cleaning the pad

1 Valve
2 Pad

1. Slightly pull the valve (1) until the bleed position is reached. So it is possible to move the pad manually.
2. Slide the pad (2) to a position where the underside of the pad is easily accessible.
3. Clean the underside of the pad.
   Remove particles with a soft brush or a vacuum cleaner.
   Remove label fragments and traces of adhesive with alcohol if necessary.
4. The suction holes on the underside of the pad must be free.
5. Perform a visual check of the pad (2) and the slide foil on the underside of the pad. If the slide foil is damaged, it must be replaced.

NOTICE!
Slide the valve (1) back to the operate position!

4 Replacing Assembly Units

4.1 Recommended Tools

The following tools are recommended for servicing the PAM 3600 Printer-Applicator-System:

Standard Tools

- double open-end wrench 4x5
- double open-end wrench 5,5x7
- double open-end wrench 8x9
- double open-end wrench 10x13
- double open-end wrench 12x14
- double open-end wrench 14x17
- allen key 1,5; angular
- allen key 1,25; angular
- allen key 2; angular
- allen key 2,2; angular
- allen key 3; angular
- allen key 4; angular
- allen key 5; angular
- norm allen key 2,5; with hilt
- precision allen key size 0
- Philipps screw-driver size 1
- Philipps screw-driver size 2
- socket wrench 4,5
- socket wrench 7
- snap ring pliers
- flat pliers
- Torx TX 20

Special Tools

- allen key 0.9 with long hilt (cab part number: 5945114)
- spring hook (cab part number: 5906109)
- spring scale 5 N (cab part number: 5909017)
- spring scale 25 N (cab part number: 5909018)
- spring scale 10 N (cab part number: 5906108)
- test collar (cab part number: 5534199)
- manometer (cab part number: 5538317)
- tube loosener (manufacturer: SMC; SMC part number: TG-1)

4.2 Replacing the Printhead

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

CAUTION!
Damages by electrostatic loading!
Ground yourself to the chassis before you remove or install the printhead. This will prevent a static discharge from your body through the printhead to ground.

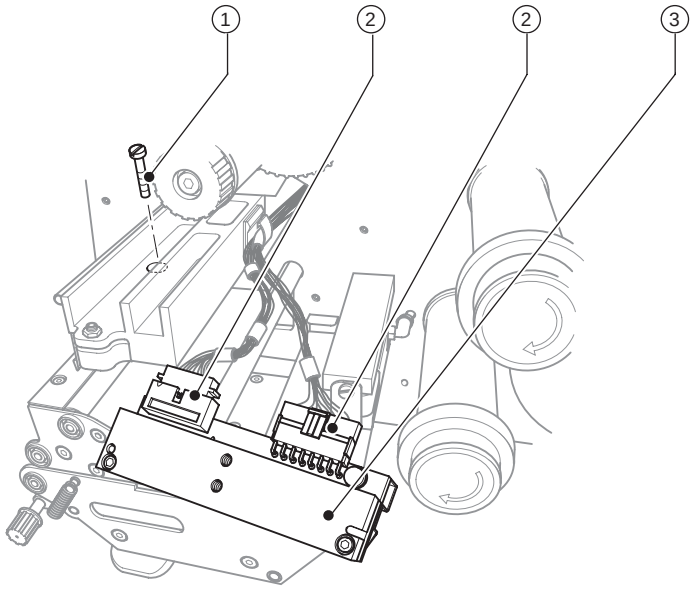


Figure 4a Replacing the printhead

1 Printhead locking screw
2 Plug
3 Printhead with head plate

1. Remove label stock and transfer ribbon from the printer.
2. Release the printhead locking screw (1) and remove the printhead with the head plate (3) from the positioning pins.
3. Move the printhead with the head plate (3) and both cables carefully sideward until the plug connectors (2) are accessible.
4. Pull out the plug connectors (2) carefully.
5. Connect the plugs (2) to the new printhead with head plate.
   Make sure that the PCB at the printhead will not be stressed mechanically.

CAUTION!
Material damage!
Handle the new printhead carefully to avoid scratching! The positioning pins must snap in on both sides!

6. Slide the printhead with the head plate (3) onto the positioning pins. Make sure that the printhead is correctly set into the positioning pins and then tighten the printhead locking screw (1) slightly. Note that the printhead fits tightly in the bracket across the entire bracket.
7. Check the position of the both printhead cables. Make sure that the cables will not be stressed mechanically and that they do not hinder other parts.
8. Perform a test print and adjust the printhead if necessary.

4.3 Replacing the Print Roller and the Feed Roller

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

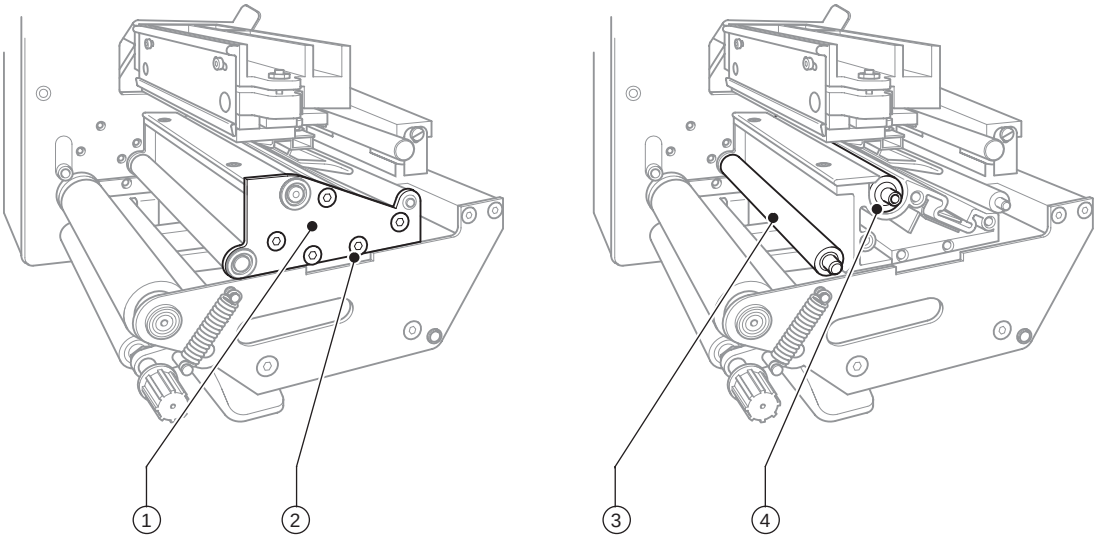


Figure 4b Replacing the print roller or the feed roller

1 Head plate
2 5 screws
3 Feed roller
4 Print roller

1. Remove label stock and transfer ribbon from the printer.
2. Loosen and remove the 5 screws (2) from the head plate (1).
3. Remove the head plate (1).
4. Pull out the print roller (4) or the feed roller (3).
5. Mount the components in reverse order.

4.4 Replacing the Transport Locking Roller

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

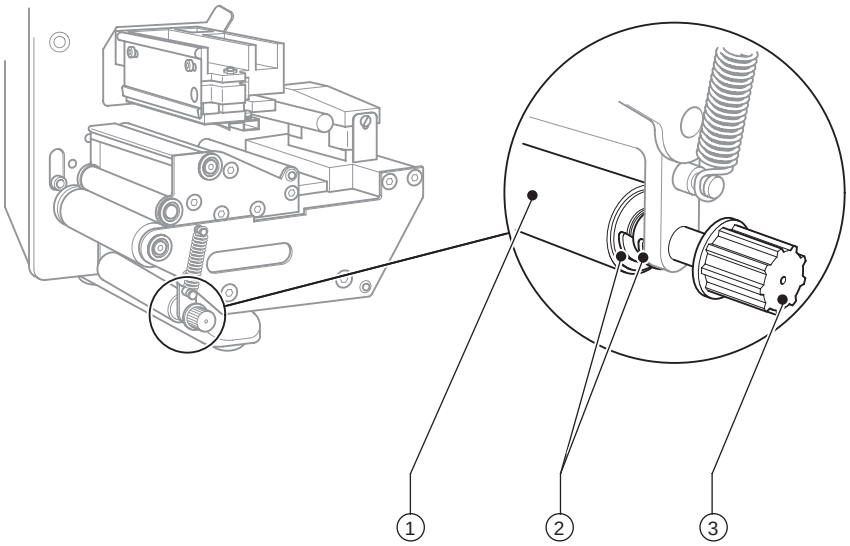


Figure 4c Replacing the transport locking roller

1 Transport locking roller
2 E-ring
3 Knurled knob

1. Remove label stock and transfer ribbon from the printer.
2. Remove the two E-rings (2) from the axle.
3. Unlock the transport locking roller (1) by pressing the knurled knob (3) downward.
4. Pull out the knurled knob (3) with the axle.
5. Remove the transport locking roller (1) and replace it.
6. Mount the components in reverse order.

4.5 Replacing the Pinch Roller

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

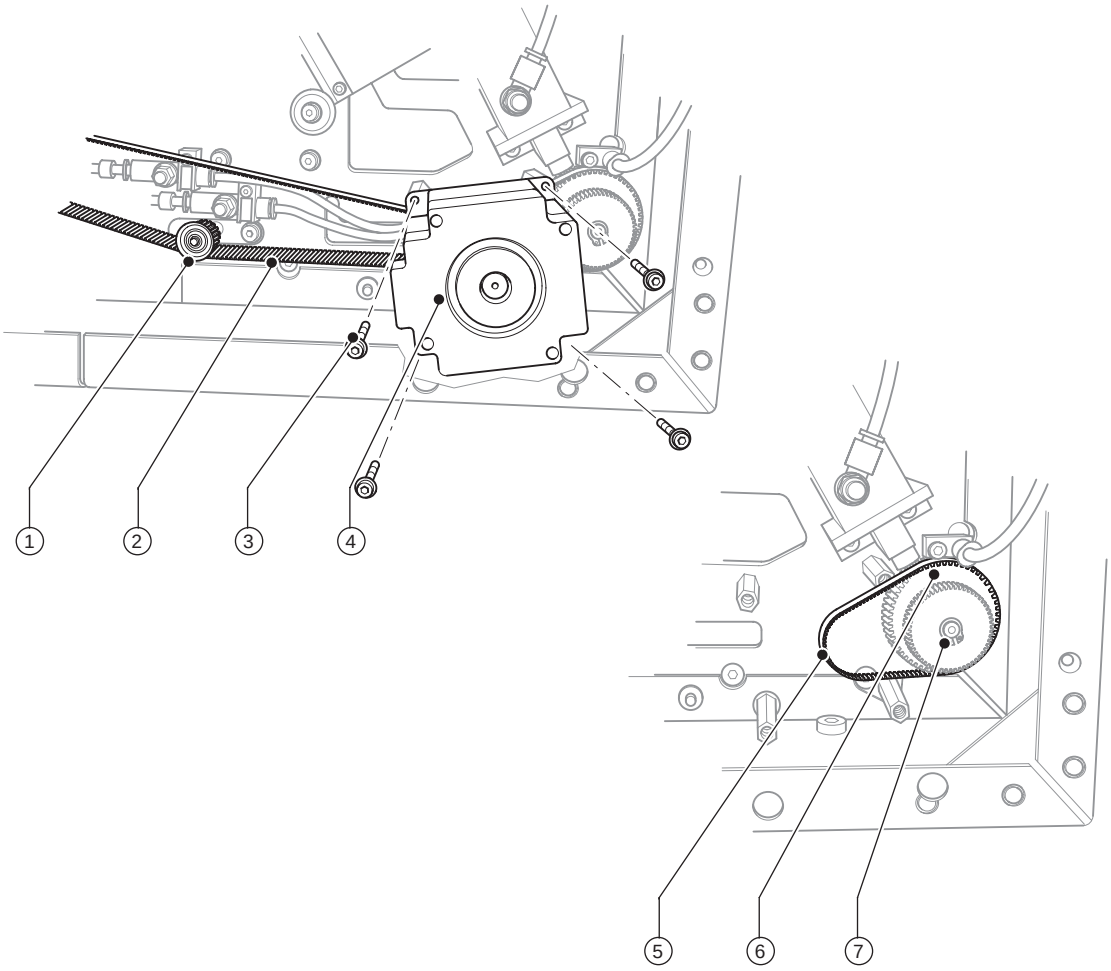


Figure 4d Preparation

1 Gear
2 Belt
3 4 screws
4 Main motor
5 Belt
6 Pulley
7 Snap ring

1. Remove label stock and transfer ribbon from the printer.
2. Unlock the transport locking roller by pressing down the knurled knob (10).
3. Remove the cover at the rear side.
4. Loosen the belt (2) by taking off it from the gear (1).
5. Remove the four screws (3) at the main drive motor and take off the motor (4).
6. Remove the belt (5) from the pulley (6).
7. Remove the snap ring (7) from the axle of the pinch roller and take off the pulley (6).

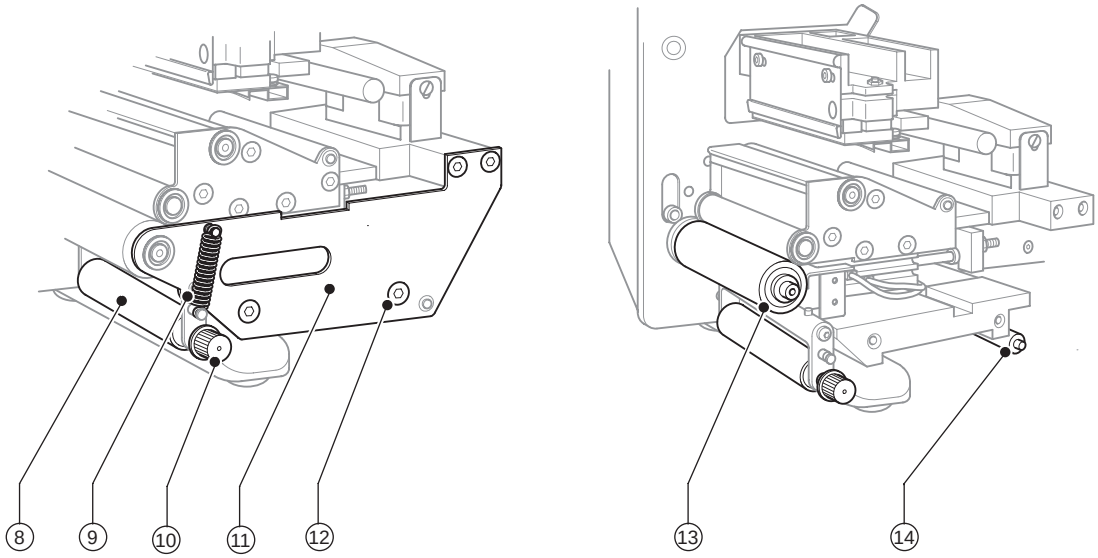


Figure 4e Replacing the pinch roller

8 Transport locking roller
9 Spring
10 Knurled knob
11 Bearing plate
12 4 screws
13 Pinch roller
14 Guide roller

8. Hang out the spring (9).

NOTICE!
Pay attention on the spring on the other side of the transport locking roller (8), do not hang out it by moving the roller or the knurled knob.

9. Loosen and remove the four screws (12) on the bearing plate (11).
10. Remove the bearing plate (11).
11. Replace the pinch roller (13).
12. Mount the bearing plate, consider here to thread the guide roller (14).
13. Lock the transport locking roller by pressing the knurled knob (10) upward.
14. Hang up the spring (9).
15. Mount the other components in reverse order.

4.6 Replacing the Label Edge Sensor

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

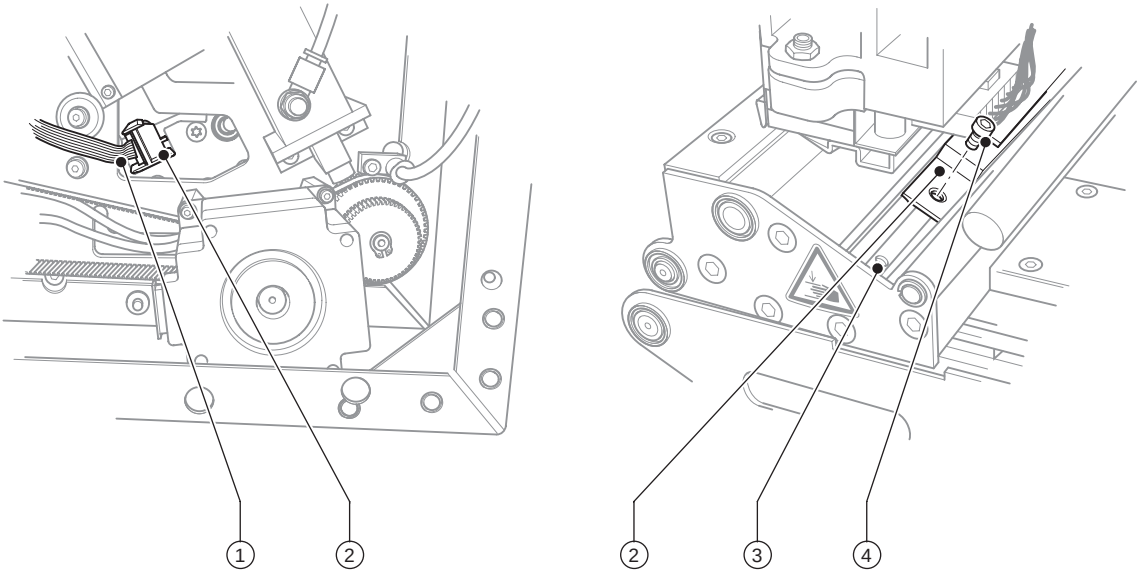


Figure 4f Replacing the label edge sensor

1 Cable
2 Label edge sensor
3 Hole
4 Screw

1. Remove label stock and transfer ribbon from the printer.
2. Remove the cover at the rear side.
3. Pull out the cable (1) from the label edge sensor (2).
4. Remove the screw (4).
5. Remove the label edge sensor (2) by pushing it through the mounting plate to the rear side.
6. Push the new label edge sensor through the mounting plate.
7. Put the screw (4) through the sensor into the hole (3) of the plate and tighten it.
8. Reassemble the other parts in reverse order.

NOTICE!
Make sure that the cable does not touch or hinder moving parts.

9. Adjust the label edge sensor (see section 2.4).

4.7 Replacing the Slip Clutches

The rewinders for the ribbon and the media and the brake for the ribbon supply hub are equipped with slip clutches.

A slip clutch has to be replaced when it can not longer be adjusted. The assembly instructions for the clutches also have to be observed when a winder has to be replaced.

The winding torque of the clutch always has to be readjusted after replacing a clutch or if it has been disassembled at any intermediate time.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

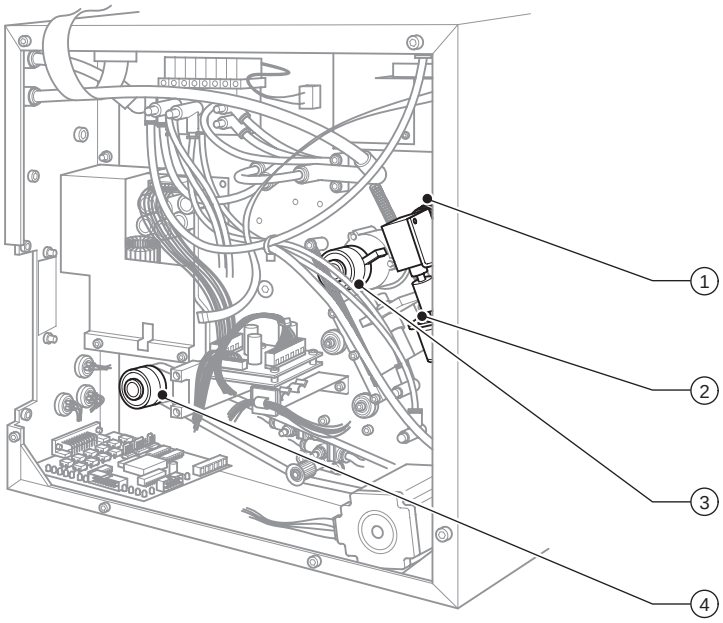


Figure 4g Slip clutches

1 Clutch of the ribbon take up hub
2 Motor for the ribbon take up hub
3 Clutch of the ribbon supply hub
4 Clutch of the internal rewinder

1. Remove label stock and transfer ribbon from the printer.
2. Remove the cover at the rear side.
3. Replace the respective clutch as described on the next pages.
4. Mount the cover at the rear side.

Replacing the Slip Clutch on the Ribbon Take Up Hub

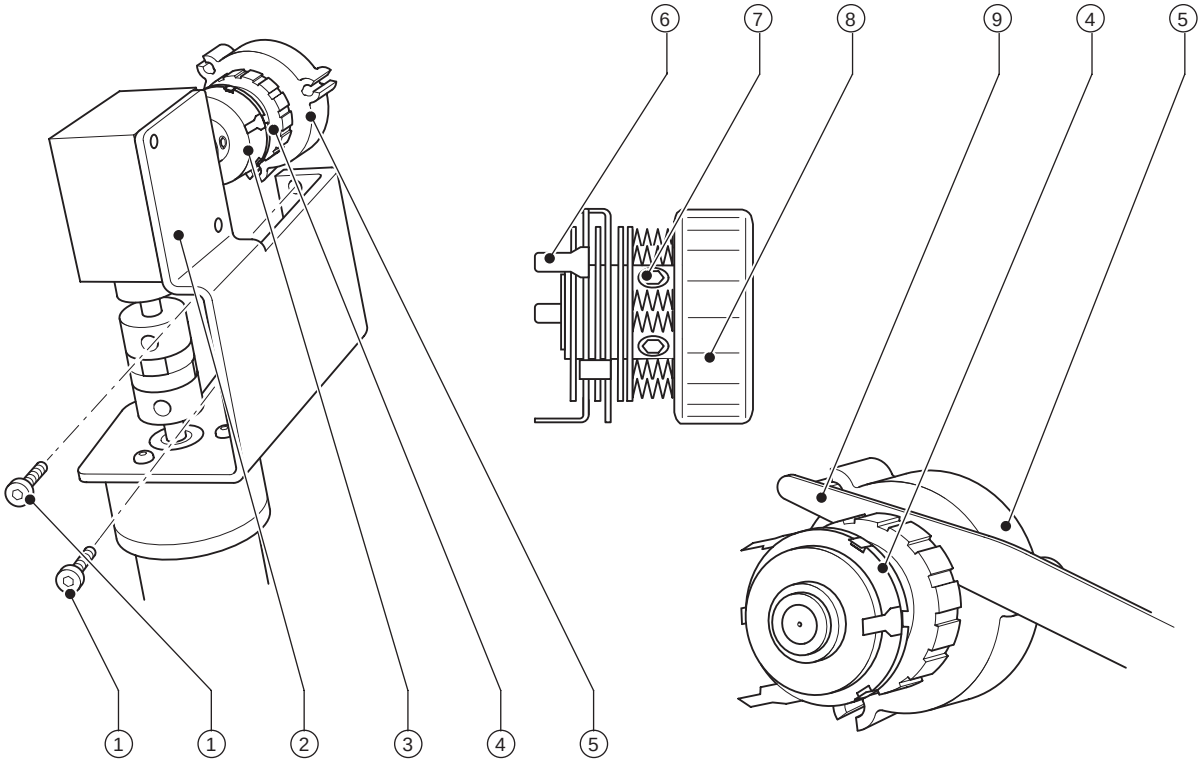


Figure 4h Slip clutch on the ribbon take up hub

1 Screw
2 Motor bracket
3 Tappet
4 Slip clutch
5 Bearing on the take up hub
6 Lugs of the clutch
7 2 set screws
8 Knurled nut of the clutch
9 Feeler gauge

1. Pull out the plug of the motor (fig. 4g, 2).
2. Remove the two screws (1) and the bracket (2) with the motor assembly and the tappet (3).
3. Loosen the knurled nut (8) of the slip clutch (4) by a few turns clockwise to reach the two set screws (7).
4. Loosen the two set screws (7).
5. Remove the slip clutch (4) from the axle of the ribbon take up hub.
6. Slide the new clutch onto the axle.
7. When pressing the clutch against the bearing (5) the knurled nut (8) must not touch the bearing. Check it by using a feeler gauge (9) or a label strip.
   If the knurled nut touches the bearing, tighten the knurled nut a little and check the clearance again.
8. Press the clutch against the bearing and tighten the two set screws (7).
9. Mount the complete motor bracket (2) with the screws (1).
   Ensure that all lugs (6) of the slip clutch snap into the slots of the tappet (3).
10. Put the plug of the motor into the corresponding socket.
11. Adjust the torque of the new slip clutch (see section 5.6).

Replacing the Slip Clutch on the Ribbon Supply Hub

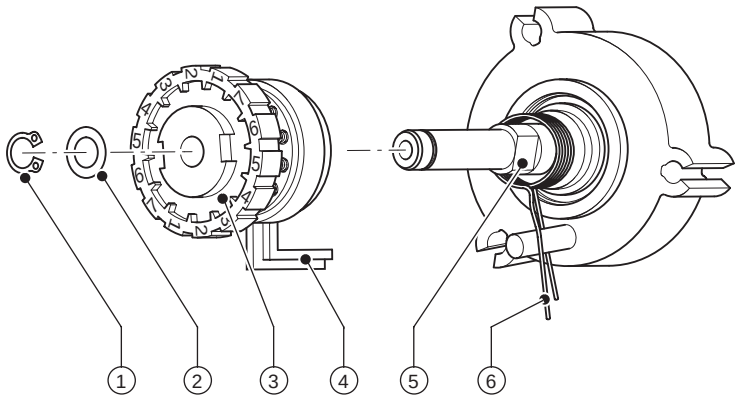


Figure 4i Slip clutch on the ribbon supply hub

1 Snap ring
2 Washer
3 Clutch
4 Lug
5 Flat
6 Spring legs

1. Remove the snap ring (1) and the washer (2).
2. Remove the clutch (3).
3. Insert the new clutch, make sure that the lug (4) is located between the spring legs (6) and that the clutch has the right position to the flat (5) on the hub.
4. Remount the washer (2) and the snap ring (1).

Replacing the Slip Clutch on the Internal Rewinder

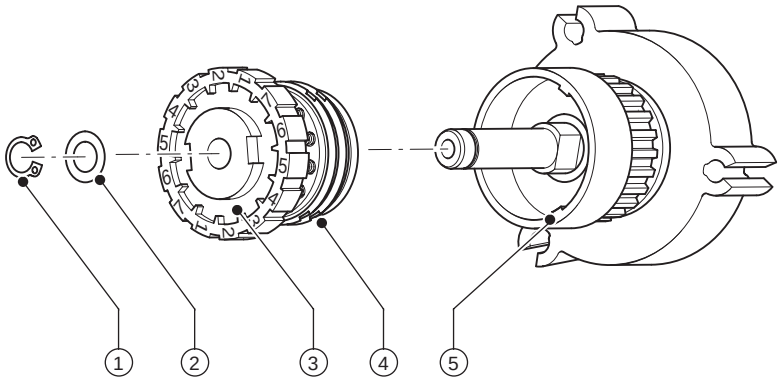


Figure 4k Slip clutch on the internal rewinder

1 Snap ring
2 Washer
3 Clutch
4 Slot
5 Lug

1. Remove the CPU PCB.
2. Remove the snap ring (1) and the washer (2).
3. Remove the clutch (3).
4. Insert the new clutch, make sure that the lugs (5) snap into the slots (4).
5. Remount the washer (2) and the snap ring (1).
6. Remount the CPU PCB.

4.8 Replacing the Main Drive Motor

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

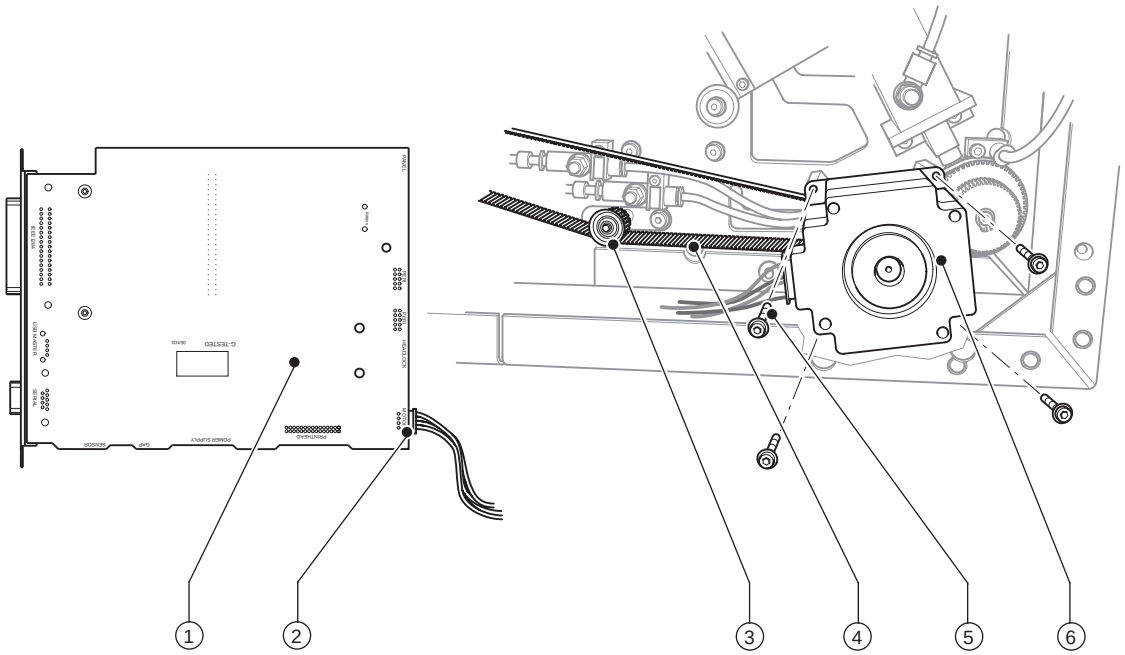


Figure 4l Replacing the main drive motor

1 CPU PCB
2 Plug
3 Gear
4 Belt
5 4 screws
6 Main drive motor

1. Remove the cover at the rear side.
2. Loosen the belt (4) by taking off it from the gear (3).
3. Pull out the plug (2) of the motor from the CPU PCB.
4. Remove the four screws (5) of the motor (6).
5. Replace the main drive motor (6).
6. Fasten the motor by tightening the four screws (5).
7. Put the plug (2) of the new motor into the socket of the PCB.
8. Tighten the belt (4) by putting it on the gear (3).
9. Mount the cover at the rear side.

4.9 Replacing the CPU PCB

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

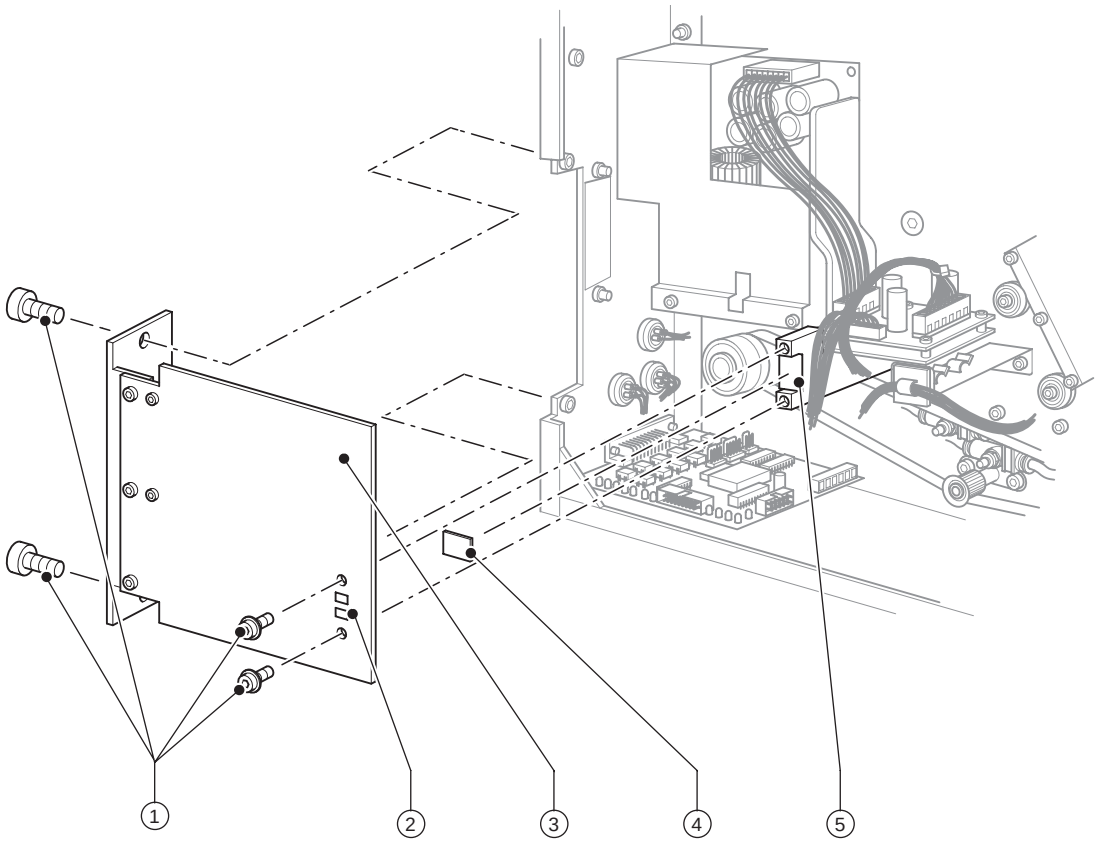


Figure 4m Replacing the CPU PCB

1 Fixing screw
2 Stepper motor driver
3 CPU PCB
4 Heat conductor pad
5 Cooling rib

1. If possible backup the settings of the printer configuration on a CompactFlash card as described in the chapter "Save NVRAM".
2. Pull out all interface connectors at the side of the printer.
3. Remove a possibly installed interface card (Ethernet, USB Slave, Twinax-/Coax Converter, RS-422/485).
4. Remove the cover.
5. Remove the cable across the CPU PCB (3).
6. Pull out all plugs of the CPU PCB (3).
7. Remove the 4 screws (1) fixing the PCB.
8. Remove the CPU PCB (3).

To provide reliable functioning of the printer, a good thermal contact between the stepper motor driver (2) on the CPU PCB (3) and the cooling rib (5) of the chassis is necessary. Therefore a pad of heat conductor foil (4) is located between the cooling rib and the stepper motor driver.

When replacing the CPU PCB, the pad may remain on the defective board. To replace a pad, one spare pad (Part No. 5943182) is delivered with the replacement board.

9. Check if the heat conductor pad (4) is sticking on the cooling rib (5) after removing the defective board.
10. Before attaching the new heat conductor pad, remove any pieces of old foil from the cooling rib. Peel the cover foil from the white pad surface first and stick it to the cooling rib as shown in the figure.
11. Now peel the cover foil from the pink surface of the heat conductor pad.

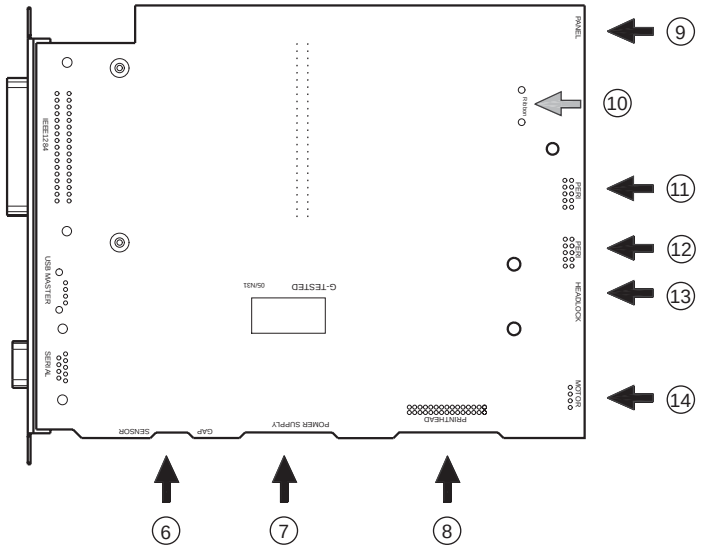


Figure 4n Connectors at the CPU PCB

6 Label edge sensor
7 Low-voltage input from power pack
8 Printhead logic connector
9 Control panel
10 Transfer ribbon sensor
11 Applicator control PCB
12 Applicator control PCB (alternative)
13 Sensor transport locking roller
14 Motor

Mounting the CPU PCB:

12. Attach the PCB and secure it with four screws M4x10 (1).
13. Insert all plugs (see figure 4n).
14. Reinstall the cable across the CPU PCB (3).
15. Reassemble the cover.
16. Reinstall the power supply connector and the connectors for the peripheral interfaces, your optional interface card inclusive.
17. If necessary carry out a firmware update.
18. Adjust the label edge sensor (see section 5.8).
19. Perform the needful adjustments in the Printer Configuration.

4.10 Replacing the Power Unit

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

WARNING!
Mortal danger by electric shock!
While switched-on, the power unit has a voltage of up to 380 V as a function of the capacitor. However, when the printer or power unit is switched off, this voltage falls to non dangerous levels (< 42 V) within one minute. Be aware of these hazards!

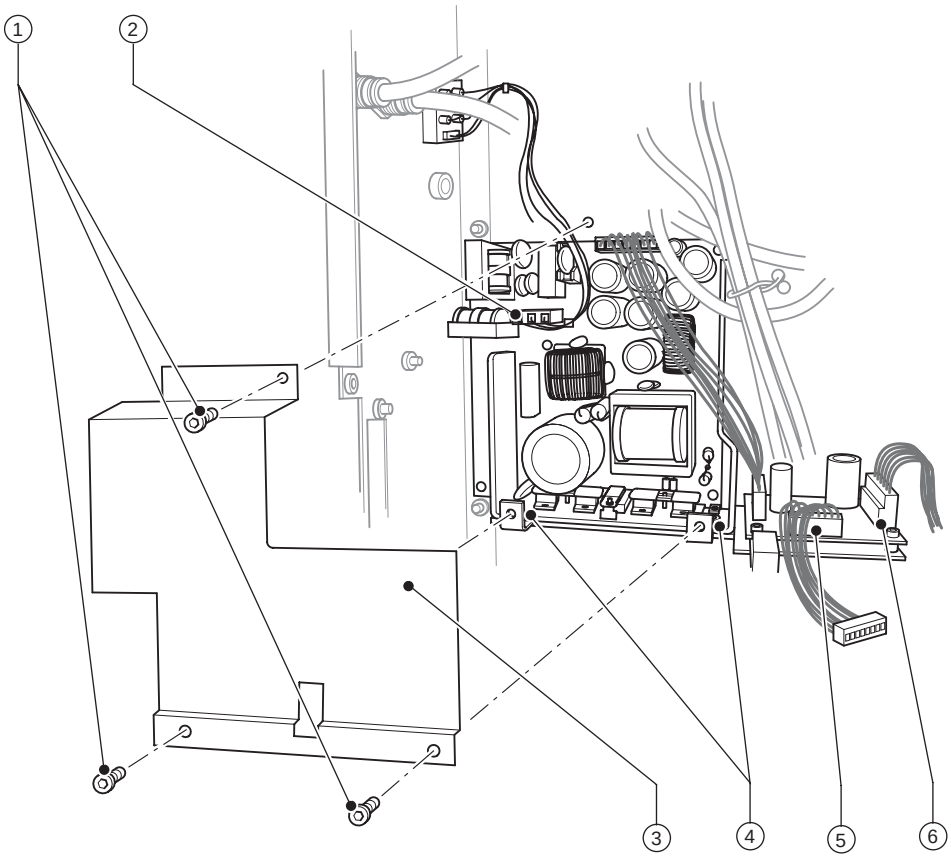


Figure 4o Replacing the power unit

1 Fixing screw for the cover plate
2 Power input module connector
3 Cover plate
4 Fixing screw for the power unit
5 Power cable connector
6 Printhead power cable connector

1. Remove the cover.
2. Dismount the CPU PCB as described in section 4.9.
3. Remove the three screws M4x6 (1) and the cover plate (3).
4. Pull out the following connectors from the power unit:
   - power input (2)
   - power cable (5)
   - printhead power connection (6).
5. Remove the two screws (4) and the power supply.
6. To fit the new power supply follow the above steps in reverse order.

4.11 Replacing the Applicator Control PCB and Firmware Update of the Applicator Module

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

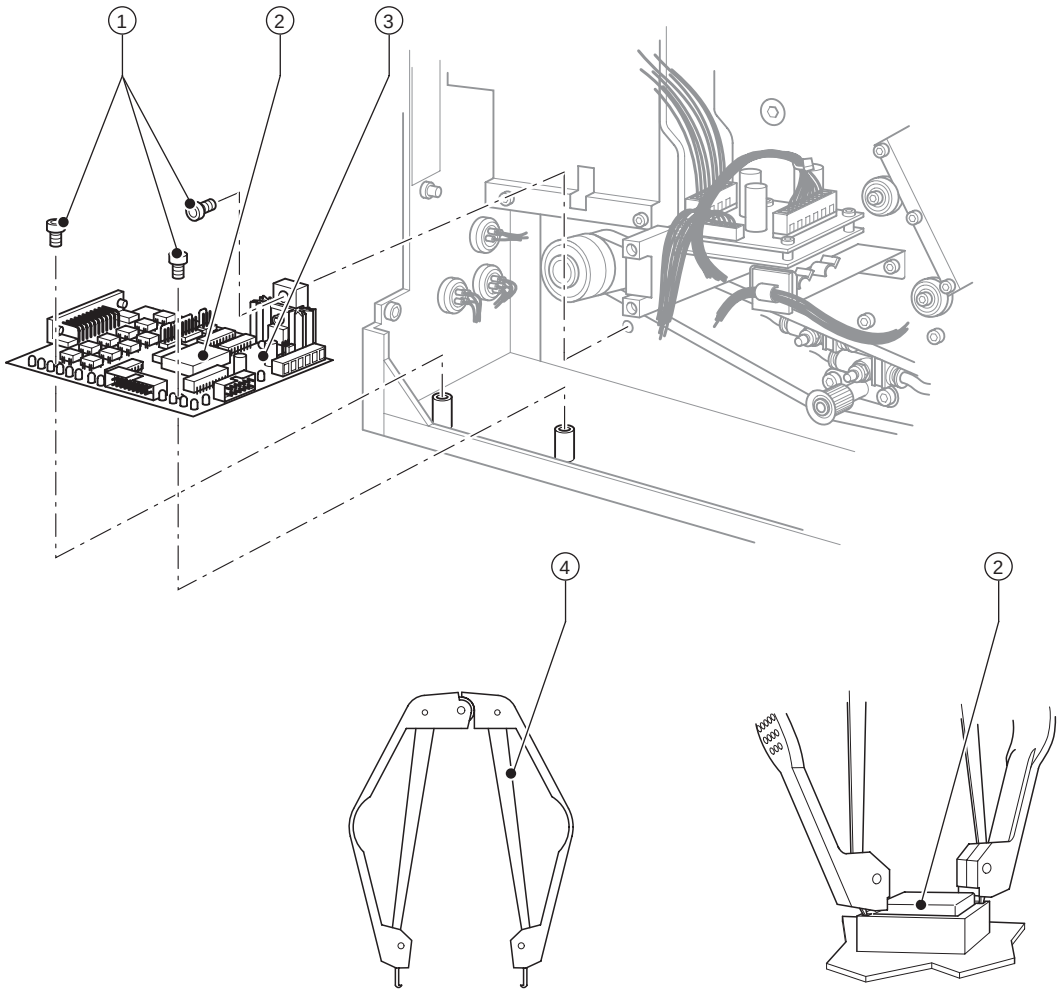


Figure 4p Replacing the applicator control PCB

1 Fixing screw
2 Controller with firmware
3 Applicator control PCB
4 PLCC extractor

Replacing the PCB

1. Remove the cover.
2. Dismount the CPU PCB as described in section 4.9.
3. Pull out all plugs from the applicator control PCB (3).
4. Remove the three screws (1) fixing the PCB (3).
5. Remove the PCB and replace it.
6. Reassemble in reverse order.

Firmware Update

1. Dismantle the applicator control PCB.
2. Pull off the controller (2) with a PLCC extractor (4) and press in the controller containing the new firmware.
3. Reassemble in reverse order.

4.12 Replacing the Sensors

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

Sensors of the Printer Module

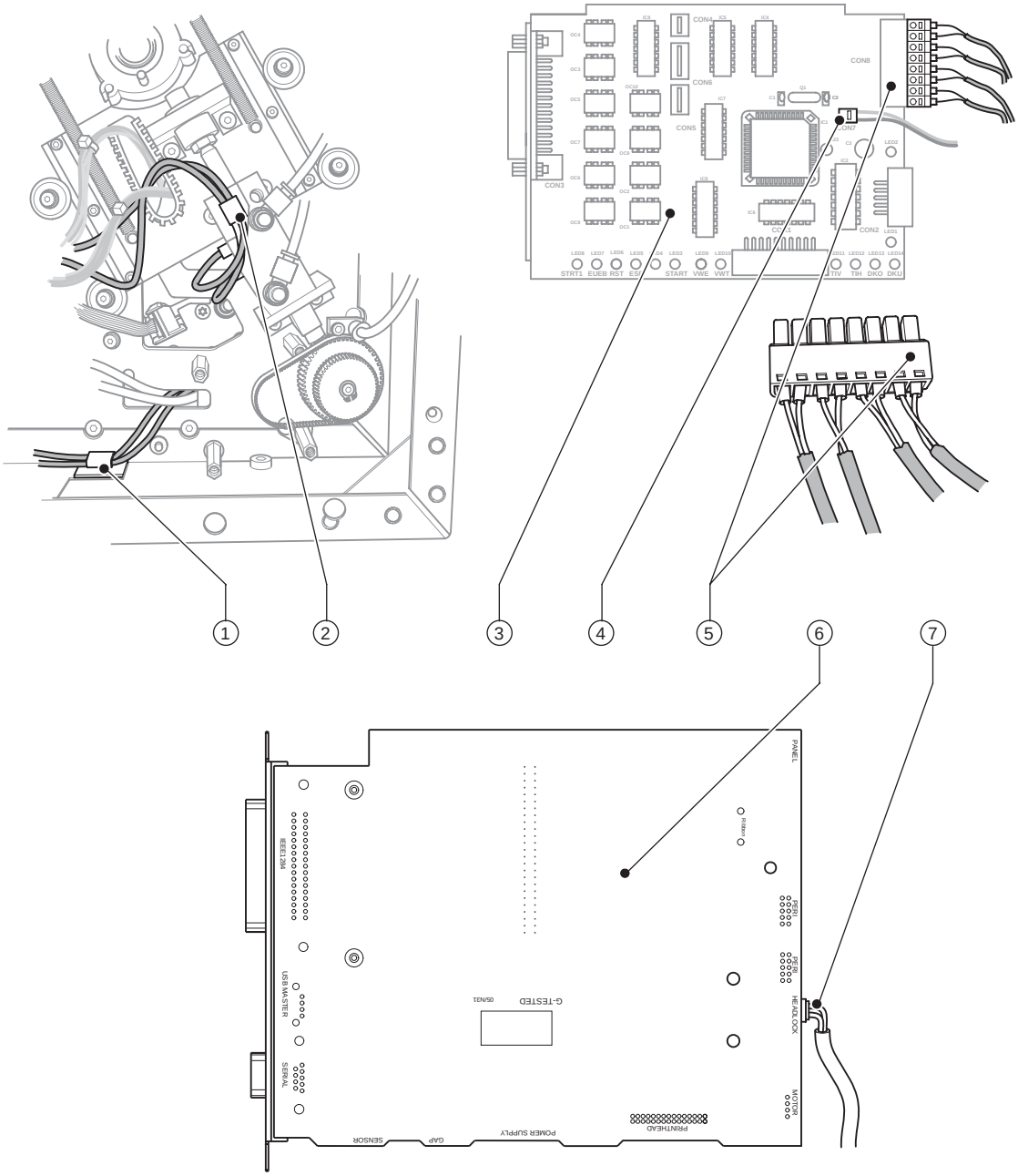


Figure 4q Replacing the sensors of the printer module

1 Cable holder, sensors peel-off table
2 Cable holder, sensor printhead cylinder
3 Applicator control PCB
4 Plug for switch paper end
5 Plug for sensors peel-off table and printhead cylinder
6 CPU PCB
7 Plug for sensor transport locking roller

Sensors peel-off table

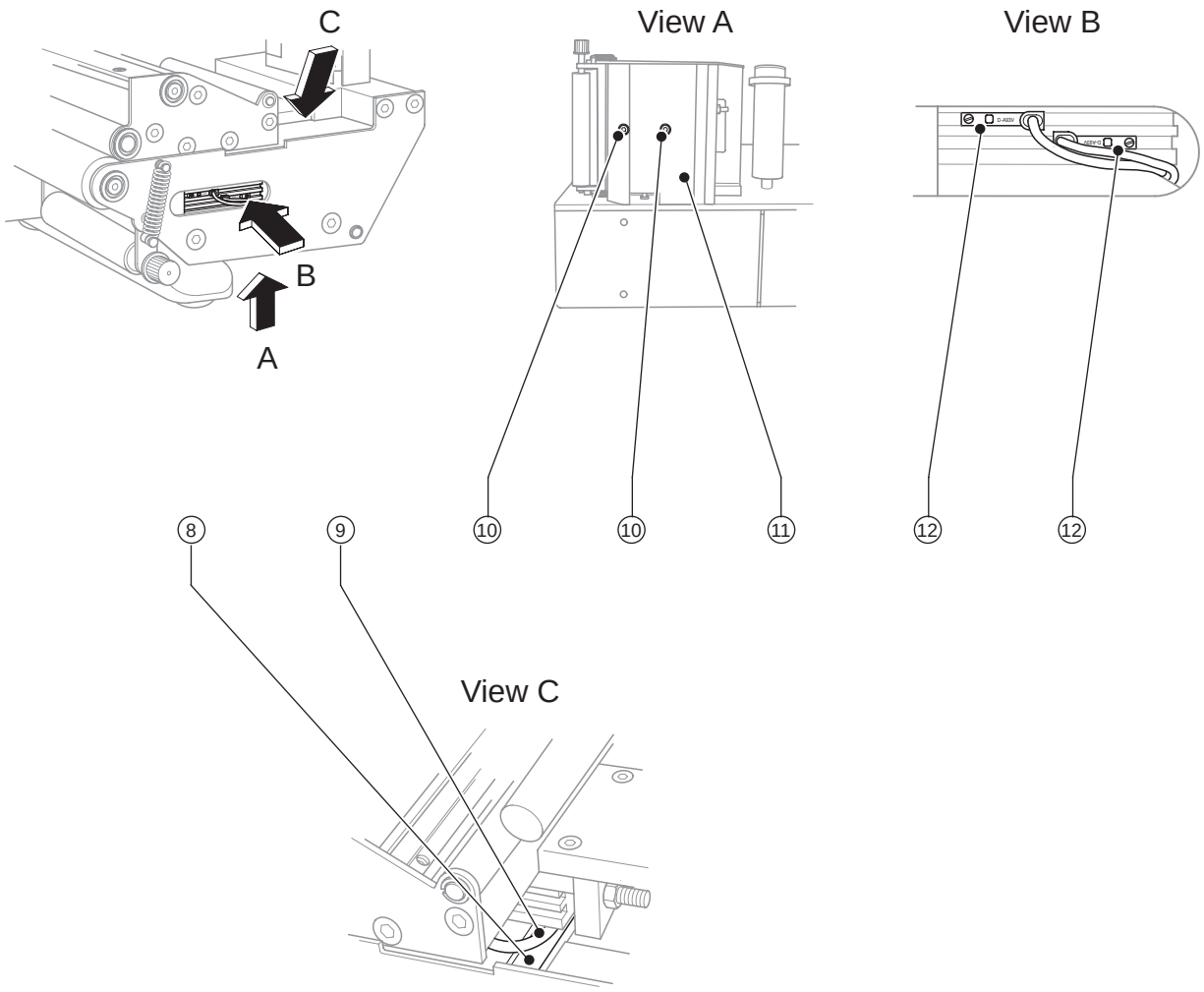


Figure 4r Replacing the sensors peel-off table

8 Canal
9 Cable
10 Screw
11 Base plate
12 Sensor peel-off table

1. Remove label stock and transfer ribbon from the printer.
2. Remove the cover.
3. Remove the cable from the cable holder (1).
4. Remove the plug (5) from the applicator control PCB (3), loosen the screws of the concerning cable and remove it.
5. Loosen the screw (do not remove it) on the concerning sensor (12) and remove the sensor.
6. Pull out the cable with the sensor.
   Therefore loosen (not remove) the two screws (10) on the base plate (11) below the peel-off table.
   Now it is possible to move the cylinder above the base plate to push the sensor with the cable (9) through the canal (8) and the mounting plate to the rear side.
7. Replace the sensor and reassemble in reverse order.

NOTICE!
Pay attention before tighten the two screws (10):
Put the cable carefully in the canal (8) and click the holes of the cylinder into the positioning pins at the base plate.

8. Connect the printer to the power supply, switch on printer and compressed air.
9. Check the replaced sensor of correct adjusting and adjust it if necessary (see section 5.4).

Sensor transport locking roller

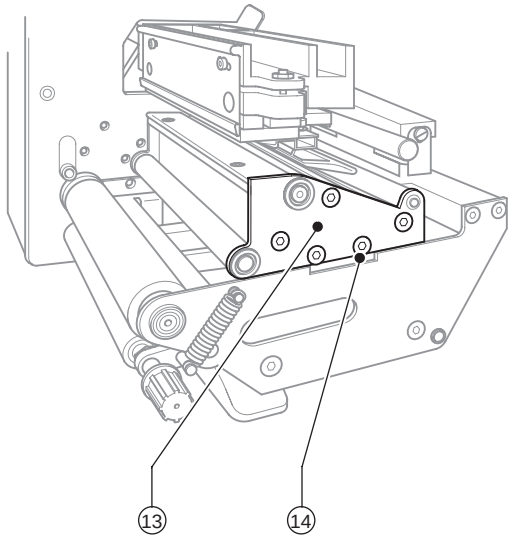


Figure 4s Preparation

13 Head plate
14 5 screws

1. Remove label stock and transfer ribbon from the printer.
2. Remove the cover.
3. Pull out the concerning plug (fig. 4q, 7) on the CPU PCB (fig. 4q, 6).
4. Loosen the five screws (14) and remove the head plate (13).
5. Move the whole mounting forward.

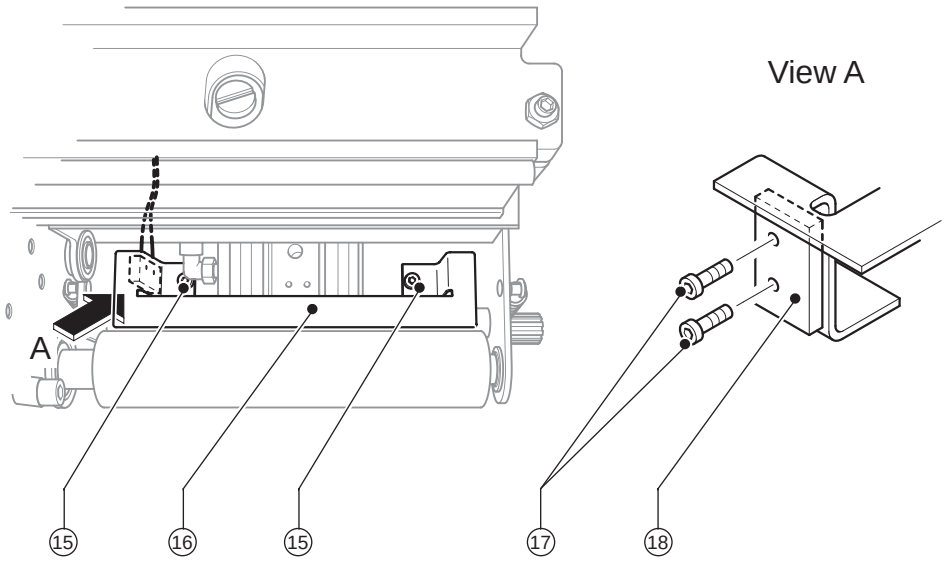


Figure 4t Replacing the sensor transport locking roller

15 Screw
16 Bracket
17 Screw
18 Sensor transport locking roller

6. Loosen the two screws (15) on the bracket (16).
7. Take out the bracket with the mounted sensor.
8. Loosen the two screws (17) holding the sensor (18).
9. Replace the sensor and reassemble in reverse order.
10. Connect the printer to the power supply, switch on printer and compressed air.

Sensors printhead cylinder

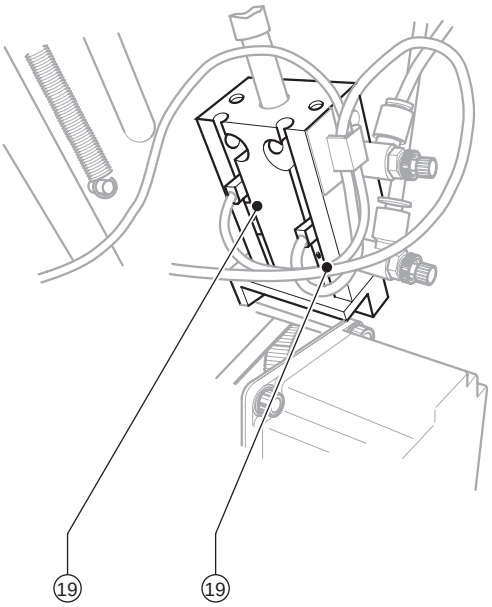


Figure 4u Replacing the printhead cylinder sensors

19 Printhead cylinder sensor

1. Remove the cover.
2. Loosen the screw on the concerning sensor (19).
3. Remove the cable from the cable holder (fig. 4q, 2).
4. Remove the plug (fig. 4q, 5) from the applicator control PCB (fig. 4q, 3), loosen the screws of the concerning cable and remove it.
5. Replace the sensor and reassemble in reverse order.
6. Connect the printer to the power supply, switch on printer and compressed air.
7. Check the replaced sensor of correct adjusting and adjust if necessary (see section 5.5).

Switch paper end

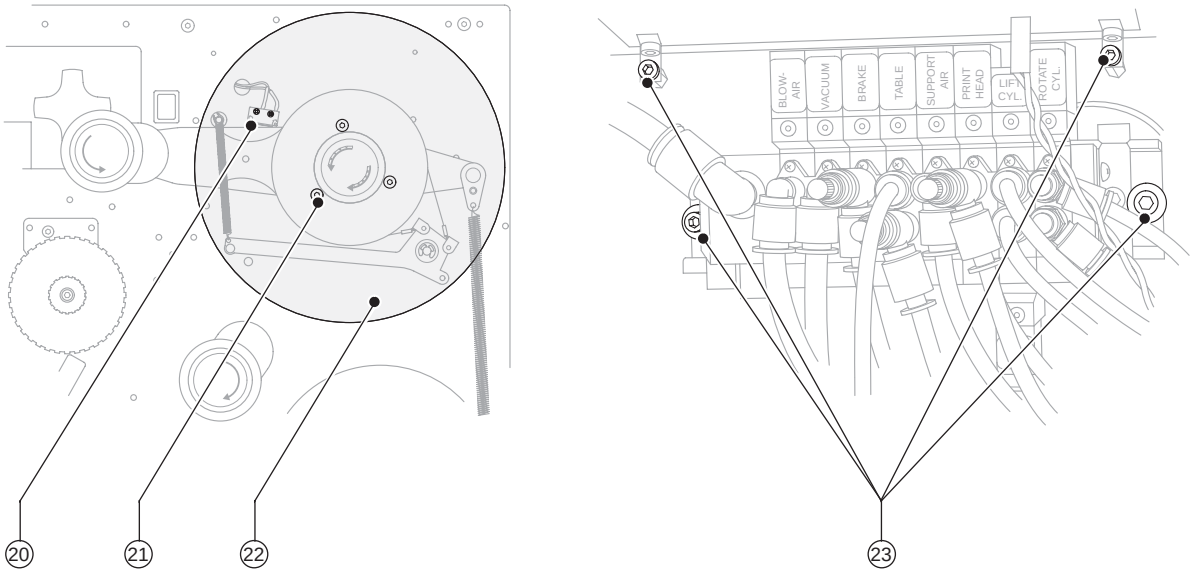


Figure 4v Replacing switch paper end

20 Switch paper end
21 3 screws
22 Plate
23 Screw

1. Remove label stock and transfer ribbon from the printer.
2. Remove the cover.
3. Remove the flange and the adapter from the media supply hub.
4. Remove the three screws (21) and the plate (22) from the media supply hub.
5. Remove the two screws of the micro switch paper end (20).
6. Pull out the concerning plug (fig. 4q, 4) on the applicator control PCB (fig. 4q, 3).
7. Remove the four screws (23), move the manifold assembly with the concerning PCB and pull out the plug (fig. 4q, 4) through the hole in the mounting plate.
8. Mount all components in reverse order.

Sensors of the Applicator Module

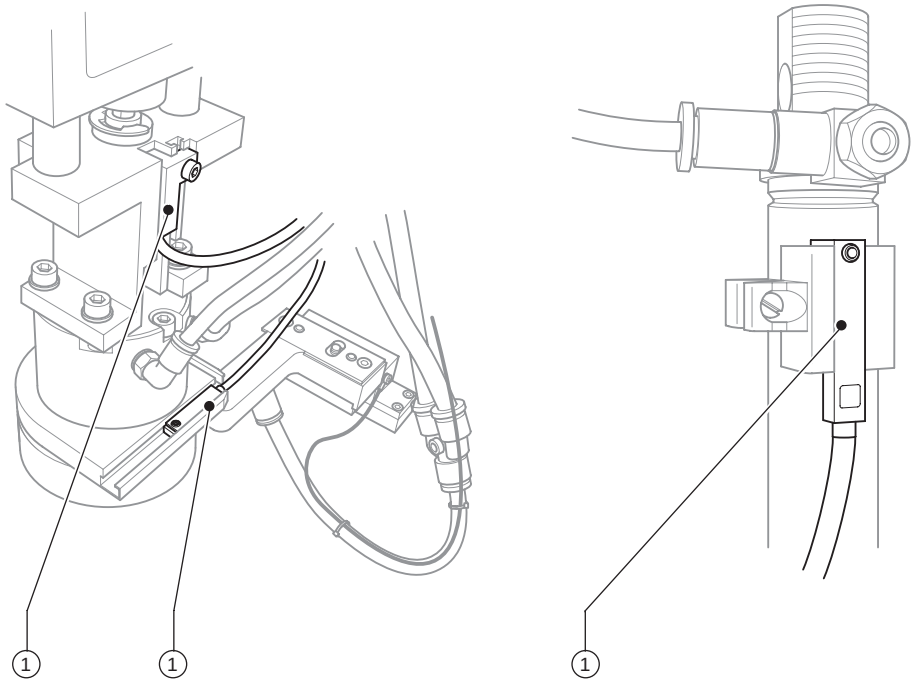


Figure 4w Unscrewing the sensors of the applicator module

1 Sensors

1. Unscrew the respective sensor (1) by loosening the corresponding screw.

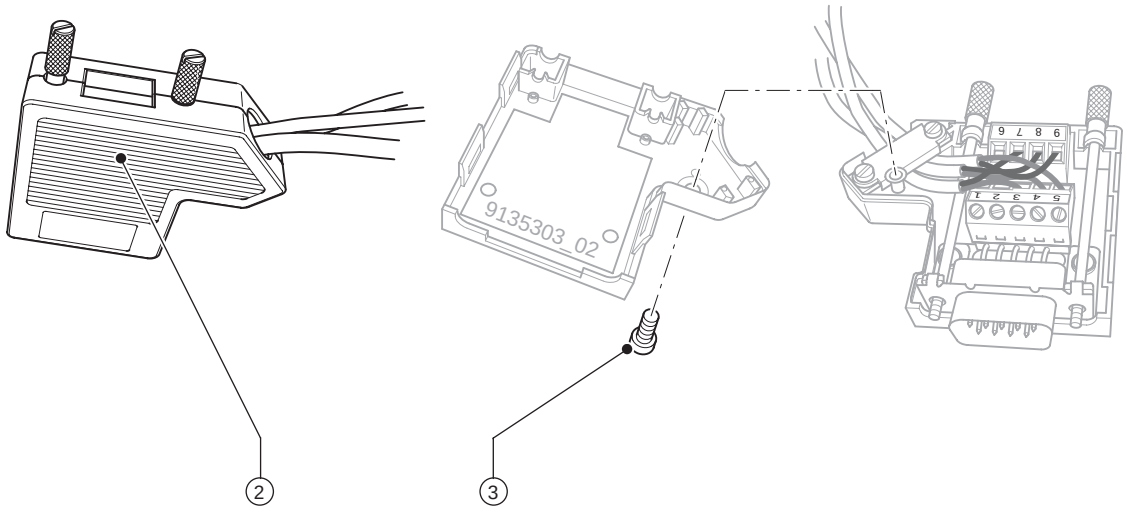


Figure 4x Replacing the sensors of the applicator module

2 Plug
3 Screw

2. Pull out the plug (2).
3. Remove the cover of the plug by loosen the screw (3).
4. Remove the concerning cable from the connector by loosen the respective screws.
5. Open the energy-chains if necessary (see section 4.13).
6. Replace the sensor and reassemble in reverse order.
7. Connect the printer to the power supply, switch on printer and compressed air.
8. Adjust the replaced sensor if necessary (see section 5.14).

4.13 Disassembling the Energy-Chains

If a cable contained in the energy-chains is to be changed, proceed as follows:

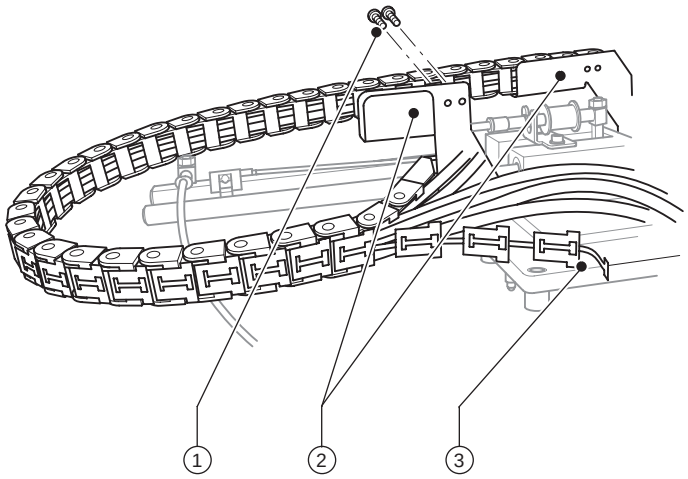


Figure 4y Disassembling the energy-chains

1 2 screws
2 Holder
3 First track link

1. Loosen the two screws (1) of one of the holders (2) and take the chains from the holder.
2. Zip the outer side of the chains open by pulling out the first track link (3).
3. Change the respective cable and reassemble the chains in reverse order.

5 Adjustments

5.1 Adjusting the Peel-off Table

For optimum print and application quality, it is important to adjust the front position and the back position of the peel-off table exactly.

This adjustment has already been performed in the factory. Nevertheless, it may become necessary to adjust it.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

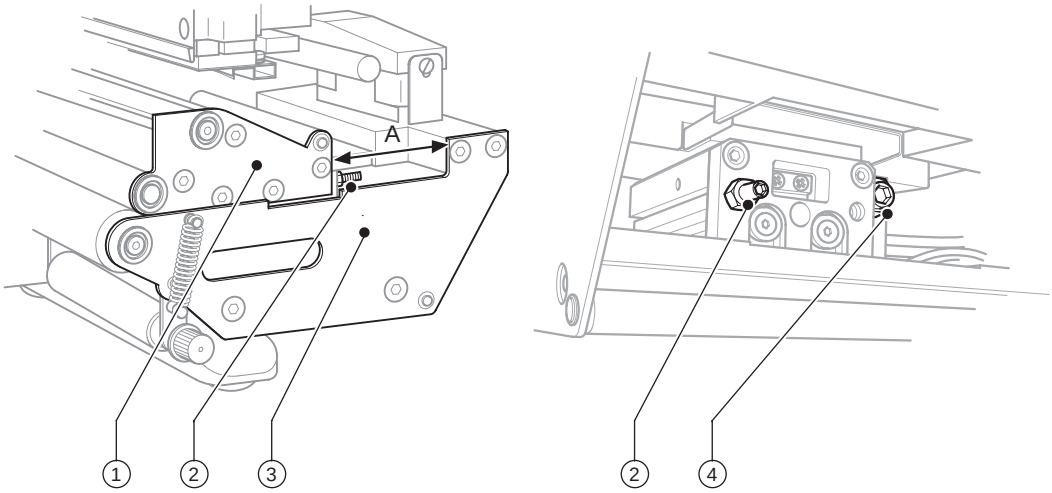


Figure 5a Adjusting the peel-off table

1 Peel-off table
2 Threaded pin with nut
3 Bearing plate
4 Threaded pin with nut

Adjusting the front position

1. Slide the peel-off table (1) to its front position.
2. Check the front position by measuring the distance **A** between the rear edge of the table (1) and the front edge of the bearing plate (3).
   A distance A on 52 ± 0.2 mm is recommended.
   If an adjusting is necessary, carry out the following steps.
3. Loosen the nut on the threaded pin (2).
4. Align the table to the recommended value by turning the threaded pin (2).
5. Tighten the nut on the threaded pin (2).
6. Check the function of the sensor for the front position of the peel-off table (see section 5.4).

Adjusting the back position

1. Slide the peel-off table (1) to its back position.
2. Check the back position by measuring the distance **A** between the rear edge of the table (1) and the front edge of the bearing plate (3).
   A distance A on 26 ± 0.2 mm is recommended.
   If an adjusting is necessary, carry out the following steps.
3. Loosen the nut on the threaded pin (4).
4. Align the table to the recommended value by turning the threaded pin (4).
5. Tighten the nut on the threaded pin (4).
6. Check the function of the sensor for the back position of the peel-off table (see section 5.4).

5.2 Adjusting the Printhead

For optimum print quality, the line of heating elements on the printhead must be parallel and adjusted correctly to the print roller. This adjustment has already been performed in the factory.

Nevertheless, it may become necessary to adjust it.

A misaligned printhead causes a poor quality which appears as described below:

- the print image looks generally light, spotted, and irregular or
- the print image appears uneven from one side to the other.

When these errors occur it is recommended to adjust the printhead.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

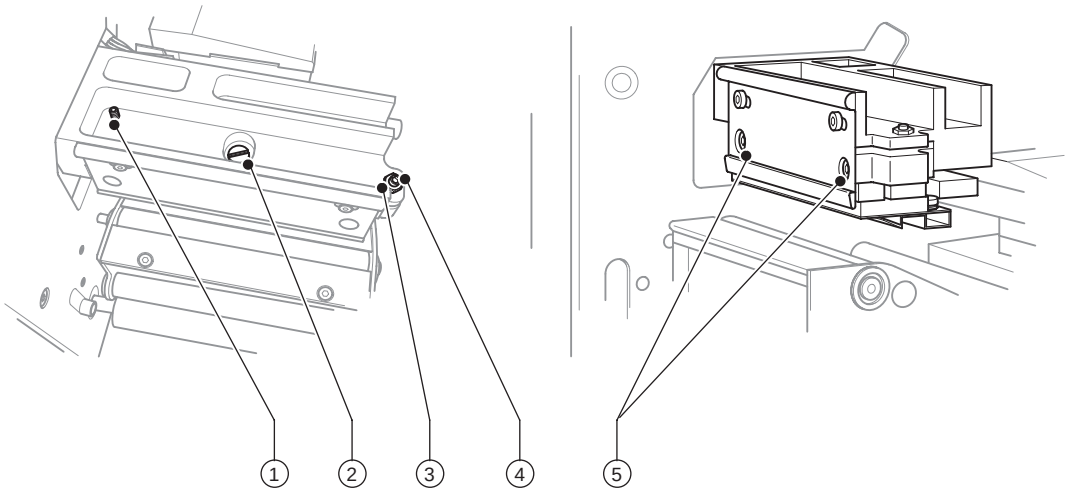


Figure 5b Adjusting the printhead

1 Screw
2 Printhead mounting screw
3 Nut
4 Screw
5 Screw

Adjusting the printhead horizontally parallel to the print roller

1. Leave the material inside the printer.
2. Release the printhead mounting screw (2).
3. Adjust the printhead by turning the both screws (5).
4. Perform a test print.
   Horizontal lines must be parallel to the label edge
5. Go on adjusting if necessary.
6. Tighten the printhead mounting screw (2) if the adjustment is finished.

Adjusting the printhead vertically parallel to the print roller

1. Leave the material inside the printer.
2. Loosen the screw (1).
3. Loosen the nut (3).
4. Adjust the printhead by turning the screw (4).
5. Perform a test print, for instance a wide black line over the whole width of the label.
6. Go on adjusting if necessary.
7. Tighten the nut (3) and the screw (1) if the adjustment is finished.

5.3 Adjusting the Guide Plate

It is possible that the guide plate (2) becomes loose by the movement during the operating process. For that reason it is necessary to readjust the guide plate to guarantee a proper print image.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

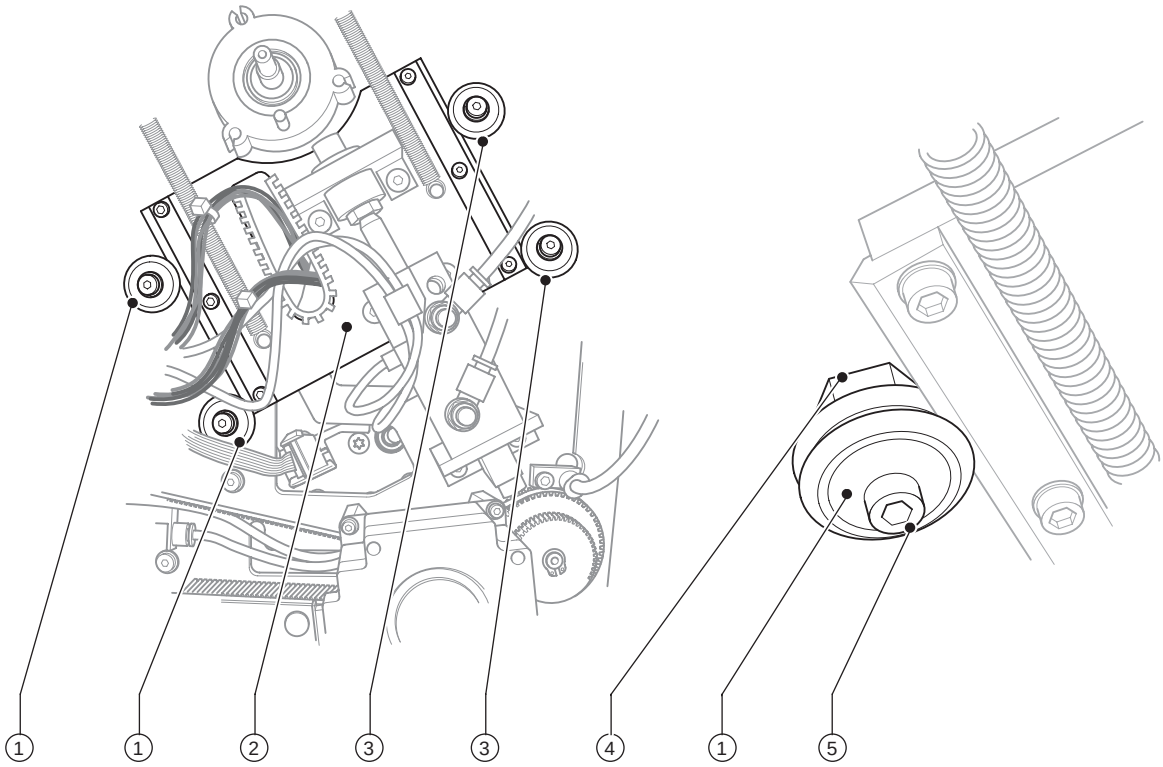


Figure 5c Adjusting the guide plate

1 Guide wheel
2 Guide plate
3 Guide wheel
4 Bushing
5 Nut

1. Remove the cover.
2. Check the clearance of the guide plate (2) by moving the four guide wheels (1, 3) on both sides of the plate manually.
   When the clearance is too large it is possible to move the wheels lightly.
3. Loosen the nuts (5) of the two guide wheels (1) on the left side.
4. Tighten the two guide wheels (1) by screwing the respective hexagon adapter bushing (4) to readjust the guide plate. These wheels are mounted eccentrically.
5. Tighten the two nuts (5).
6. Mount the cover.

5.4 Adjusting the Sensors of the Peel-off Table

After replacing a sensor ore after mechanical adjustments it is necessary to adjust the sensors of the peel-off table.

The correct adjustment of the peel-off table can be checked by watching the concerning LEDs on the applicator control PCB. If one of the LEDs does not shine during the table movement the sensor has to be adjusted.

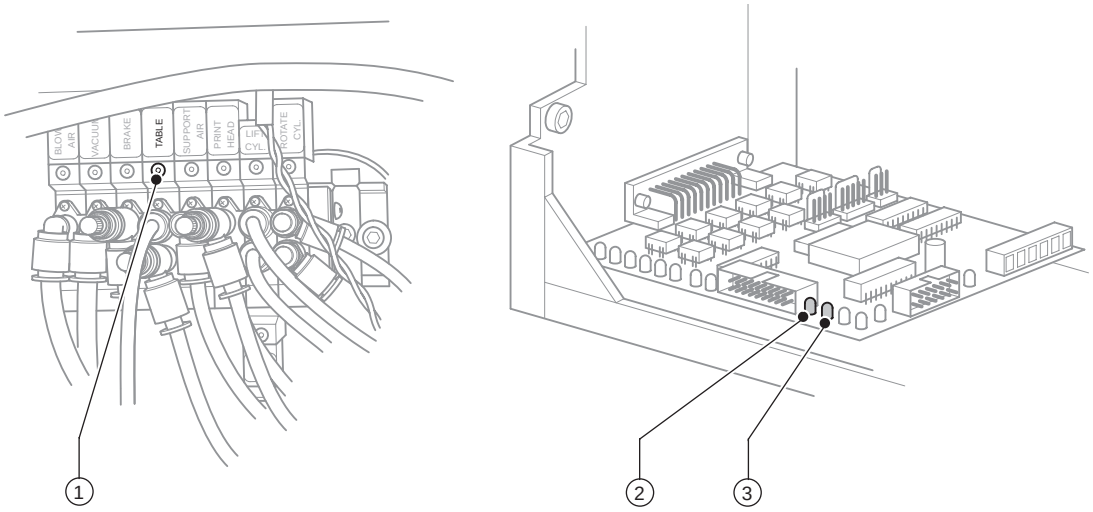


Figure 5d Checking the LEDs

1 Valve key table
2 LED TIV
3 LED TIH

1. Remove the cover.
2. Release a movement of the table (4) by pressing the integrated key (1) on the concerning valve.
3. Check the LEDs (2, 3).
   LED TIV (2) must shine if the front position of the table is adjusted.
   LED TIH (3) must shine if the back position of the table is adjusted.

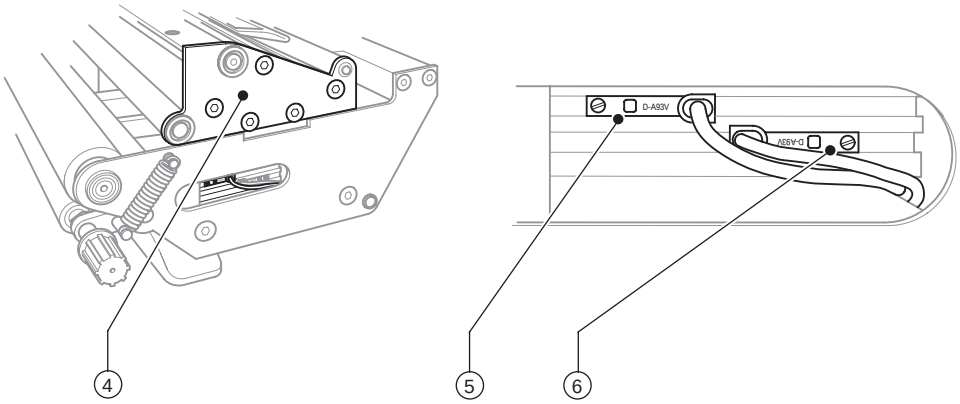


Figure 5e Setting the peel-off table position

4 Table
5 Upper sensor - front position
6 Lower sensor - back position

4. Loosen the screw on the concerning sensor (5, 6) by using a 1 mm screwdriver.
   The upper sensor (5) recognizes the front position of the table. LED TIV (2) is shining.
   The lower sensor (6) recognizes the back position of the peel-off table. LED TIH (3) is shining.
5. Shift the respective sensor (5, 6).
6. Release a movement of the table (4) by pressing the integrated key (1) on the concerning valve.
7. Check the LEDs (2, 3).
8. Repeat the adjustment if necessary.
9. Tighten the screw on the sensor if the table is adjusted correctly.
10. Mount the cover.

5.5 Adjusting the Sensors of the Printhead

After replacing a sensor it is necessary to align the concerning sensor of the printhead.

By watching the concerning LEDs on the applicator control PCB the correct adjustment of the printhead can be checked. If one of the LEDs is not shining during the printhead movement the sensor has to be adjusted.

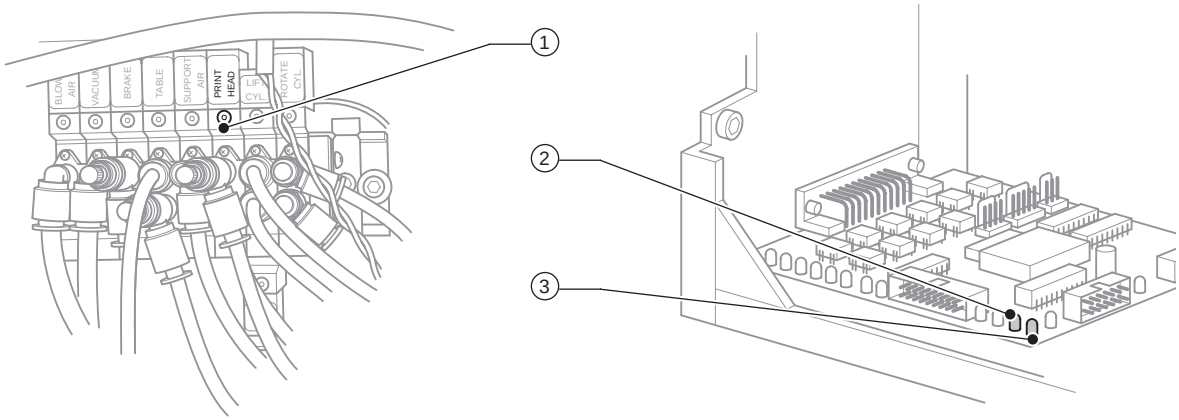


Figure 5f Checking the LEDs

1 Valve key printhead
2 LED DKO
3 LED DKU

1. Remove the cover.
2. Release a movement of the printhead by pressing the integrated key (1) on the concerning valve.
3. Check the LEDs (2, 3).

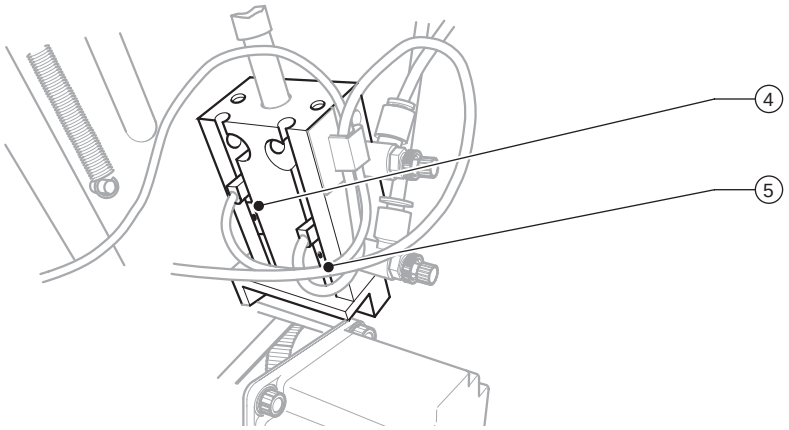


Figure 5g Setting the printhead position

4 Left sensor - upper position
5 Right sensor - lower position

4. Loosen the screw on the concerning sensor (4, 5) by using a 1 mm screwdriver.
   The left senor (4) recognizes the upper position of the printhead.
   The right sensor (5) recognizes the lower position of the printhead.
5. Shift the respective sensor (4, 5).

NOTICE!
The ribbon consumption is dependent on the right sensor for the lower position (5).
To save ribbon, adjust this sensor in the lowest possible position.

6. Release a movement of the printhead by pressing the integrated key (1) on the concerning valve.
7. Check the LEDs (2, 3).
8. Repeat the adjustment if necessary.
9. Tighten the screw on the sensor if the printhead is adjusted correct.
10. Mount the cover.

5.6 Adjusting the Torques at the Hubs

The rewinders for the transfer ribbon and the media are equipped with slip clutches. The transfer ribbon supply hub is braked during printing by another slip clutch. The slip clutches are used to adjust the torques of the hubs.

The correct adjustment of the torques of these clutches is essential:

Ribbon take up hub	for the exact transport of the transfer ribbon during label transport,
Internal rewinder	for a good rewinding quality at the media,
Ribbon supply hub	for avoiding wrinkles at the transfer ribbon feed.

The rotation is characterized by the torque. The torque results from the traction F which works vertical to the rotary axis and the distance l between the working line of the traction and the rotary axis.

So the physical relation between torque and traction is as follows:

M = F x l **M = torque**
F = traction
l = distance

Measuring the Traction at the Internal Rewinder

The traction is measured by using a string which is wound around the rewinder.

In this case the distance l results from the radius of the rewind hub (20 mm).

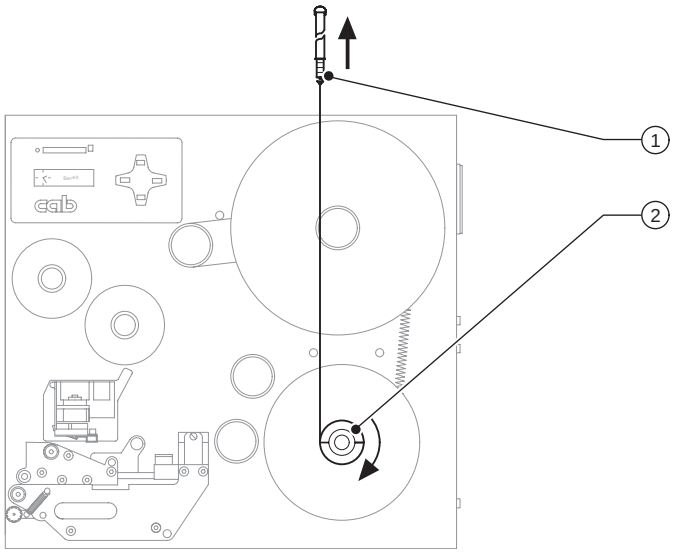


Figure 5h Measuring the traction at the internal rewinder

1 Spring scale, 25 N
2 Internal rewinder

1. Remove all label stock from the printer.
2. Wind the string several times around the internal rewinder (2).

NOTICE!
Pay attention to the wind direction as shown in the figure.

3. Attach the spring scale (1), 25 N, to the end of the string and move it vertically upwards until the hub starts to rotate.
4. Read the measured traction value F.

If the readings differ from the set value, the clutch has to be adjusted.

Set value:

Internal rewinder	M = 20 - 30 Ncm l = 2 cm --> F = 10 - 15 N

Measuring the Traction at the Ribbon Take Up and the Ribbon Supply Hub

The traction at the ribbon take up and at the supply hub is measured by using a test collar (Part no. 5534199).
In this case the distance l results from the radius of the test collar (30 mm).

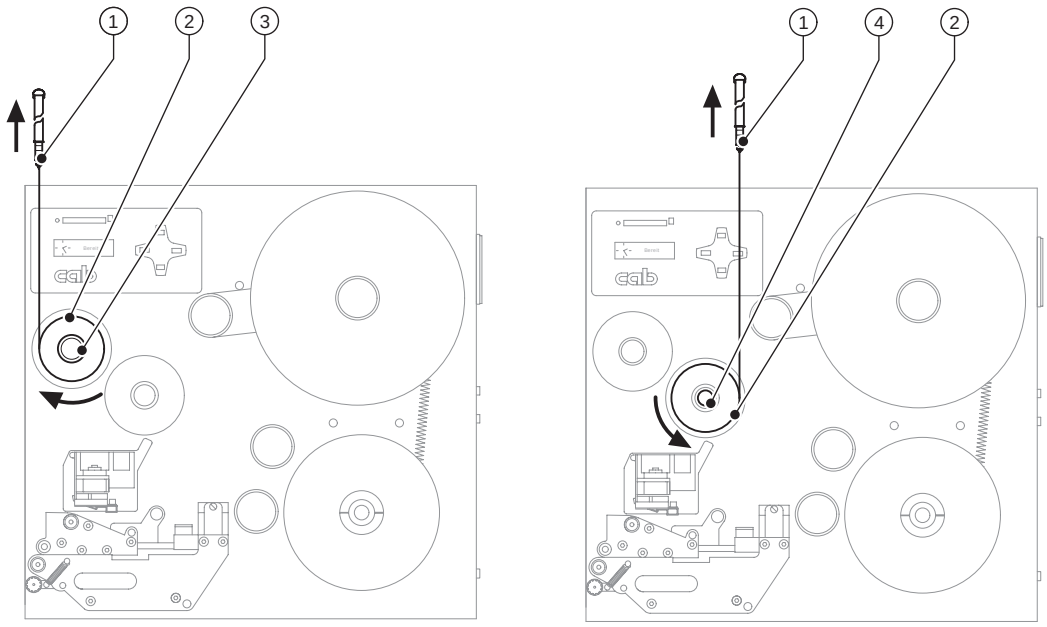


Figure 5i Measuring the traction at the hubs of the transfer ribbon

1 Spring scale, 10 N
2 Test collar
3 Ribbon take up hub
4 Ribbon supply hub

1. Remove the transfer ribbon from the printer.
2. Attach the test collar (2) to the appropriate hub (3 or 4).
3. Clamp the test collar (2) with the spreading mechanism (turn the knurled nut in counterclockwise direction).
4. Wind the string attached to the test collar (2) several times around it.

NOTICE!
Pay attention to the wind direction as shown in the figure.

5. Attach the spring scale (1), 10 N, to the end of the string and move it vertically upwards until the hub starts to rotate.
6. Read the measured traction value F.

If the readings differ from the set values, the concerning clutch has to be adjusted.

Set values:

Transfer ribbon take up hub	M = 10.5 - 13.5 Ncm l = 3 cm --> F = 3.5 - 4.5 N
Transfer ribbon supply hub	M = 4.5 - 6.0 Ncm l = 3 cm --> F = 1.5 - 2.0 N

Adjusting the Torques

If the measured values differ from the set values proceed the adjustment as follows.

WARNING!
Mortal danger by electric shock!
Disconnect power supply!
Switch off compressed air!

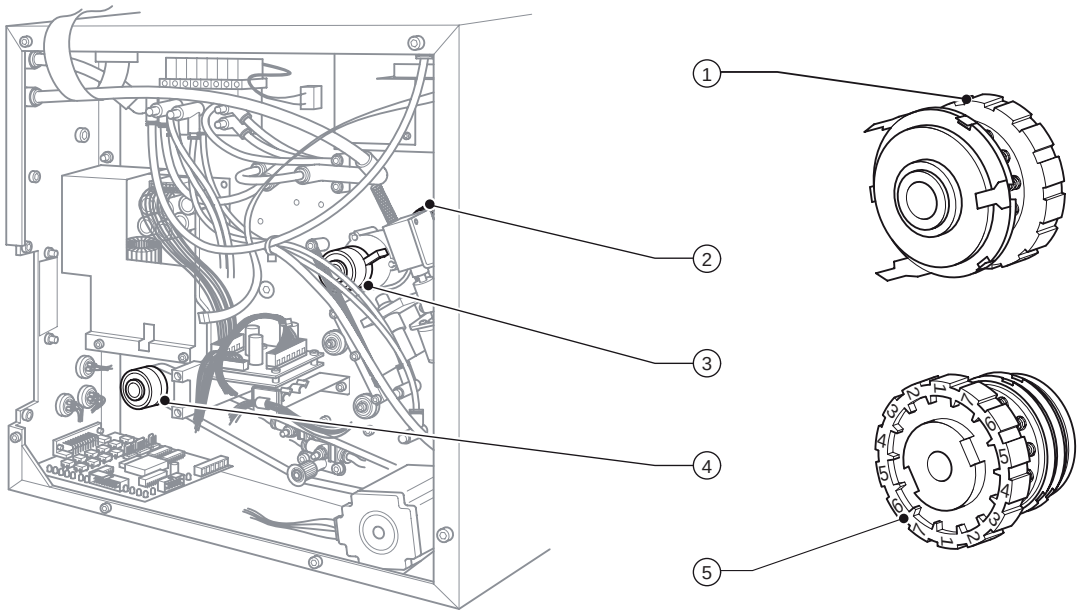


Figure 5k Adjusting the torques

1 Knurled nut of the clutch ribbon take up hub
2 Clutch of the ribbon take up hub
3 Clutch of the ribbon supply hub
4 Clutch of the internal rewinder
5 Knurled nut of the clutches ribbon supply hub and internal rewinder

1. Remove the cover.
2. To adjust the torque at the internal rewinder, remove the CPU PCB (see section 4.9).
3. Ribbon supply hub and internal rewinder:
   Adjust the winding torque by pressing in the knurled nut (5) of the corresponding clutch (3, 4) and turning it.
   Note the numbers on the nut:
   Turning to a higher number increases the torque,
   turning to a lower number decreases the torque.

   Ribbon take up hub:
   Adjust the winding torque by turning the knurled nut (1) of the clutch (2).
   Turning it counterclockwise increases the torque,
   turning it clockwise decreases the torque.

NOTICE!
If there are numbers on the knurled nut, they are no setting values but for orientation only.

4. Repeat the measuring.
5. Remount the CPU PCB if necessary and mount the cover.
6. Connect the printer to the power supply, switch on printer, switch on compressed air.

5.7 Adjusting the Brake at the Media Supply Hub

The media supply hub is equipped with a brake system. The torque of this system is depending by the position of the swing arm (1).

This system of brake and swing arm make it possible:

- to speed up the media supply hub soft also when using heavy label stock and high print speed,
- to guarantee a nearly constant torque at the media regardless of the diameter of the label stock, this is necessary for a precise media movement.

A misaligned system can cause several errors as follows:

- The swing arm hits the upper limitation, it is forming a loop of media and the media runs sideward, so it can cause damages of the media.
- The swing arm hits the lower limitation, this can cause a faulty media transport mainly when speeding up heavy label stock.

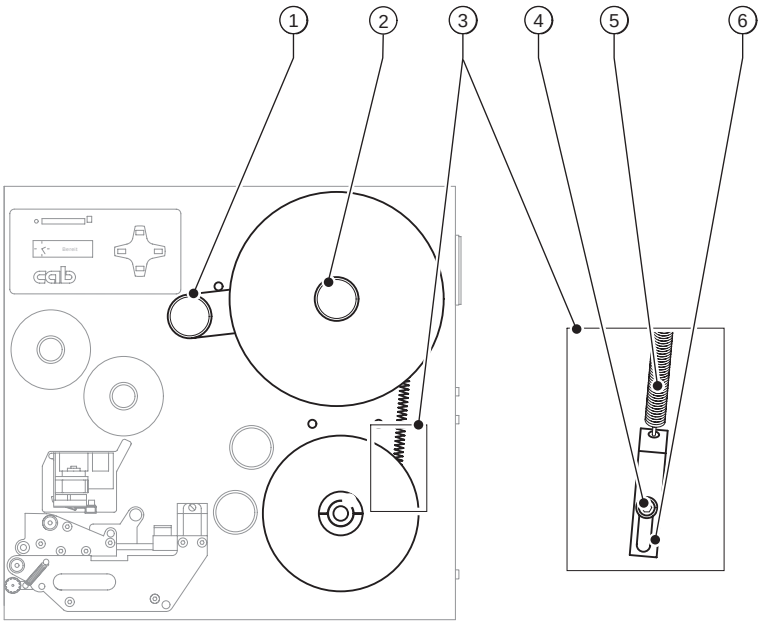


Figure 5l Brake at the media supply hub

1 Swing arm
2 Media supply hub
3 Tension spring attachment
4 Fixing screw
5 Tension spring
6 Slotted hole plate (standard attachment)

Normally, it is not necessary to adjust the brake.

In exceptional cases, e.g. for particularly loosely wound labels, the tension spring attachment (3) is to be adjusted.

Loosen the fixing screw (4), shift the slotted hole plate (6) accordingly and tighten the screw (4) again.

5.8 Adjusting the Label Edge Sensor

To adjust the label edge sensor see section 2.4.

5.9 Setting the Speed of the Compressed Air Driven Assemblies

Setting the Speed of the Peel-off Table Movement

The speed of the peel-off table movement can be set via two valves. Those valves regulate the speed of the compressed air.

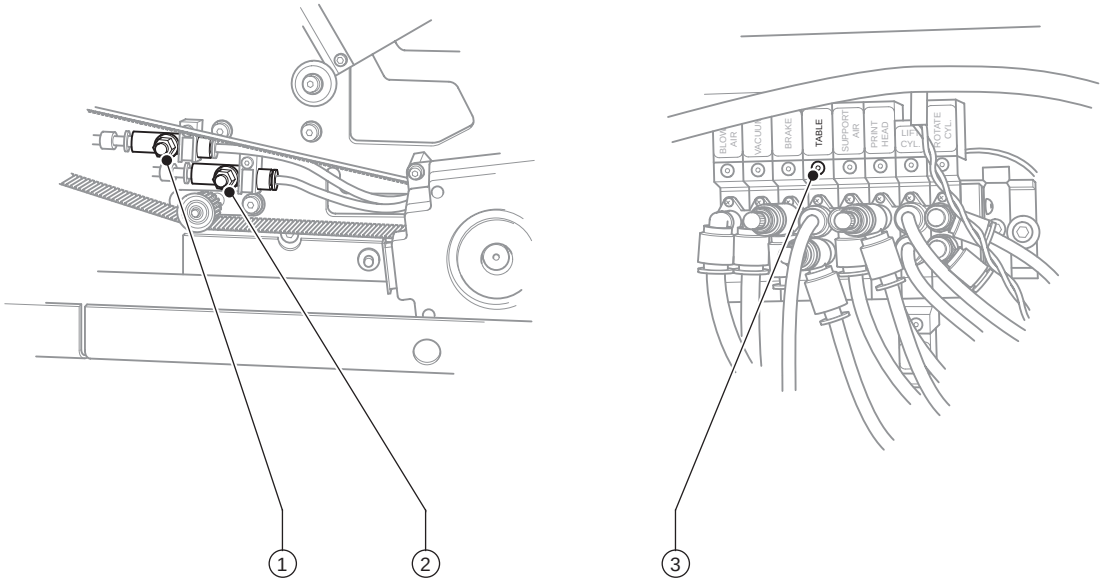


Figure 5m Setting the speed of the peel-off table movement

1 Valve for forward movement
2 Valve for backward movement
3 Valve key table

1. Remove the cover.
2. Turn one of the valves (1, 2) to regulate the speed.
   Turning clockwise will close the valves.
   - A wider opening of the top valve (1) speeds up the table moving forward.
   - A wider opening of the bottom valve (2) accelerates the backward movement.
3. Check the speed by releasing a movement of the table. For that purpose press the integrated key (3) on the concerning valve.
4. If the setting is correct mount the cover.

Setting the Speed of the Printhead Movement

The speed of the printhead movement can be set via two valves. Those valves regulate the speed of the compressed air.

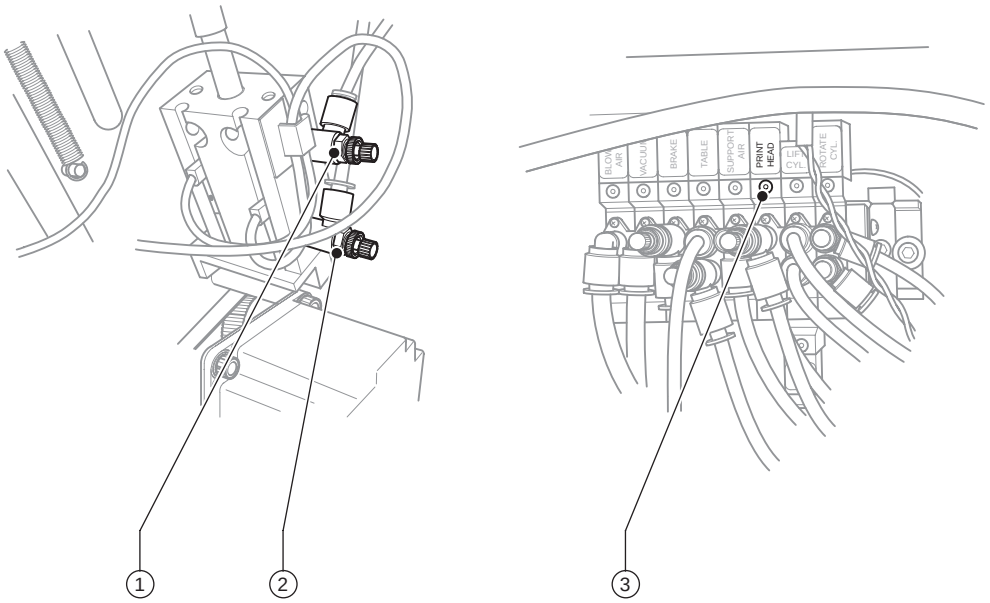


Figure 5n Setting the speed of the printhead movement

1 Valve for upward movement
2 Valve for downward movement
3 Valve key printhead

1. Remove the cover.
2. Turn one of the valves (1, 2) to regulate the speed.
   Turning clockwise will close the valves.
   - A wider opening of the top valve (1) speeds up the printhead moving upward.
   - A wider opening of the bottom valve (2) accelerates the downward movement.
3. Check the speed by releasing a movement of the printhead. For that purpose press the integrated key (3) on the concerning valve.
4. If the setting is correct mount the cover.

Setting the Speed of the Turn/Lift Cylinder Movement

The speed of the turn cylinder (PAM 3602) respective the lift cylinder (PAM 3603) movement also can be set via two valves.

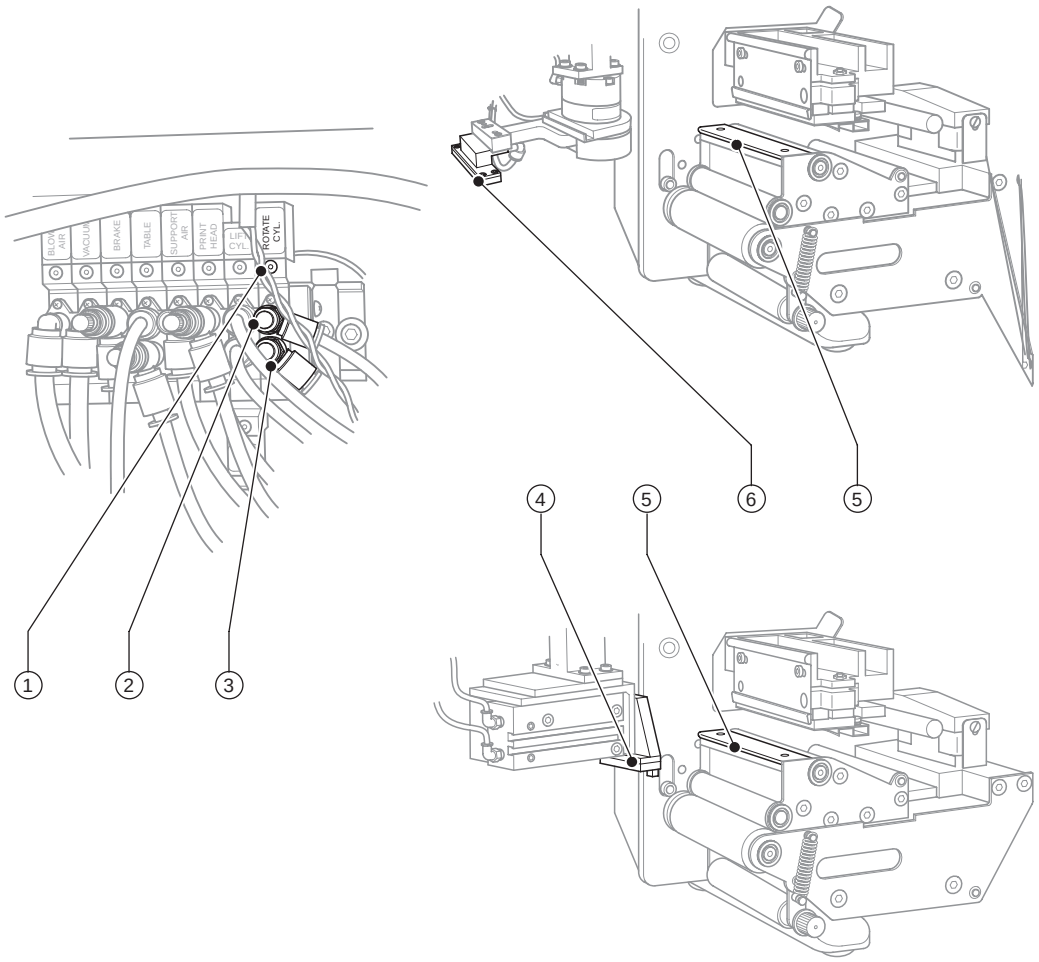


Figure 5o Setting the speed of the turn/lift cylinder movement

1 Valve key turn/lift cylinder
2 Valve for movement from the dispense edge
3 Valve for movement to the dispense edge
4 Pad PAM 3603
5 Dispense edge
6 Pad PAM 3602

1. Remove the cover.
2. Turn one of the valves (2, 3) to regulate the speed.
   Turning clockwise will close the valves.
   - A wider opening of the top valve (2) speeds up the pad (4, 6) moving from the dispense edge (5) of the printer.
   - A wider opening of the bottom valve (3) speeds up the pad (4, 6) moving to the dispense edge (5) of the printer.
3. Check the speed by releasing a movement of the turn/lift cylinder. For that purpose press the integrated key (1) on the concerning valve.
4. If the setting is correct mount the cover.
5. Check the time for the turning movement.

Setting the Speed of the Main Cylinder Movement

The speed of the lift cylinder movement can be set via two throttle valves which are mounted on the cylinder.
Those valves regulate the speed with which the compressed air escapes the two air containers.
The valves are adjustable by turning the respective throttle screws.

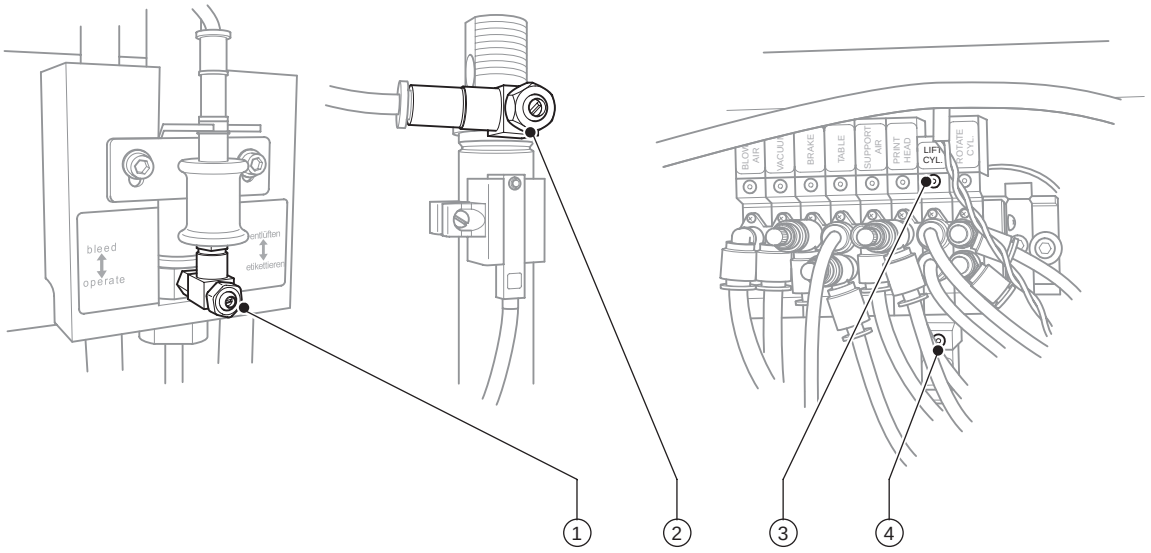


Figure 5p Setting the speed of the main cylinder movement

1 Bottom valve main cylinder
2 Top valve main cylinder
3 Valve key main cylinder upward
4 Valve key main cylinder downward

1. Remove the cover.
2. Turn the screw in the bottom valve (1) to set the speed of the downward movement.
   Turn the screw in the top valve (2) to set the speed of the upward movement.
   Turning clockwise will close the valves.
   - A wider opening of the bottom valve (1) speeds up the pad moving down.
   - A wider opening of the top valve (2) accelerates the upward movement.
4. Check the speed by releasing a movement of the main cylinder. For that purpose press the integrated key (3, 4) on the concerning valve.
   - Pressing the key (4) the downward movement (bottom valve) is carrying out.
   - Pressing the key (3) the upward movement (top valve) is carrying out.
5. If the setting is correct mount the cover.

5.10 Pneumatic Setting of the Printhead Pressure

If there are problems with the print quality the pressure of the printhead can be measured and adjusted to the recommended value.

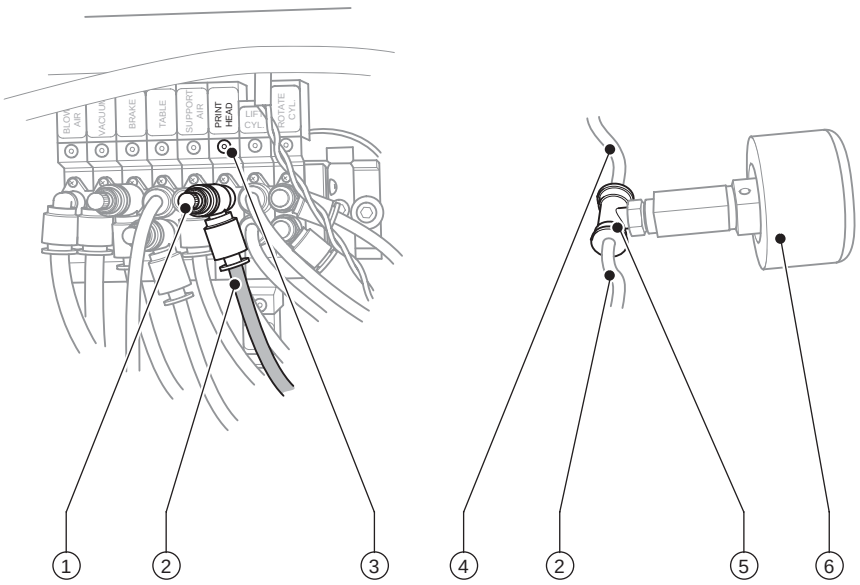


Figure 5q Setting the printhead pressure

1 Screw
2 Tube
3 Valve key printhead
4 Tube
5 T-fitting
6 Manometer

1. Switch off the printer, switch off the compressed air.
2. Remove the cover.
3. Pull the tube (2) out of the pressure regulator of the printhead valve and push it into the push-in T-fitting (5) of the manometer (6).
4. Push the tube (4) of the manometer (6) into the regulator of the printhead valve.
5. Switch on the printer, switch on the compressed air.
6. Release a printhead movement by pressing the integrated key (3) on the valve.
7. During pressing the key it is possible to measure the value of the compressed air on the printhead cylinder. **The recommended value is 6 bar**.
8. If necessary set the compressed air value to the recommended value by turning the screw (1) on the pressure regulator of the printhead valve.
   To reach the value of 6 bar, the valve must be opened completely by turning the screw clockwise.
9. Switch off the printer, switch off the compressed air.
10. Restore the normal tube connection.
11. Mount the cover.

5.11 Pneumatic Setting of the Brake

If there are problems with the brake during operation the pressure of the brake can be measured and adjusted to the recommended value.

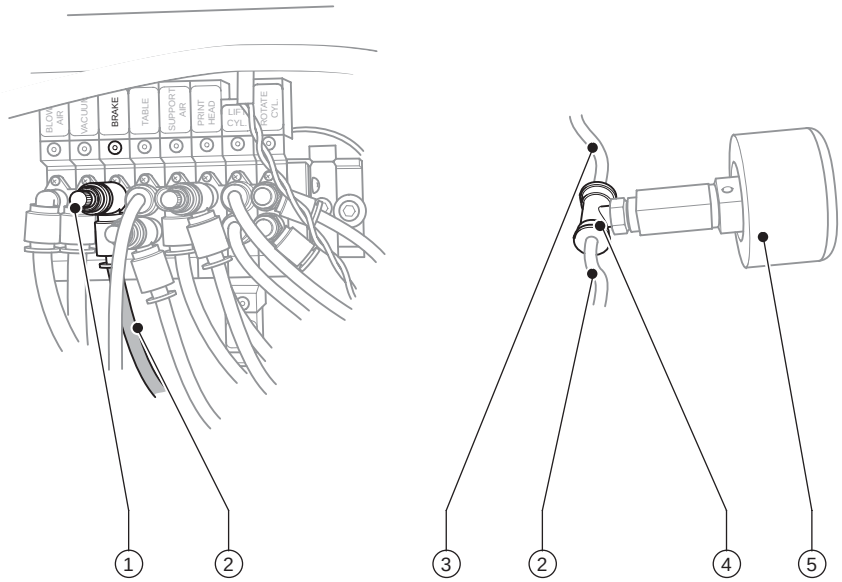


Figure 5r Setting the pressure on the brake

1 Screw
2 Tube
3 Tube
4 T-fitting
5 Manometer

1. Switch off the printer, switch off the compressed air.
2. Remove the cover.
3. Pull the tube (2) out of the valve of the brake and push it into the push-in T-fitting (4) of the manometer (5).
4. Push the tube (3) of the manometer (5) into the valve of the brake.
5. Switch on the printer, switch on the compressed air.
6. Measure the value of the compressed air on the brake.
7. If necessary set the compressed air value to the recommended value by turning the screw (1) on the valve. **The recommended value is 2 bar.**
8. Switch off the printer, switch off the compressed air.
9. Restore the normal tube connection.
10. Mount the cover.

5.12 Pneumatic Setting of the Supporting Air

If a blow tube is installed sometimes it is necessary to set the strength of the supporting air.
It is dependent from the size and the format of the label.

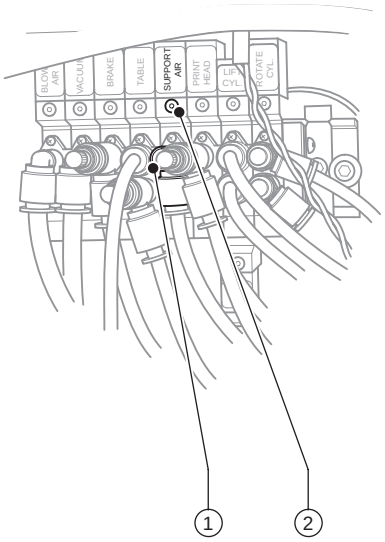


Figure 5s Setting the strength of the supporting air

1 Screw
2 Valve key supporting air

1. Remove the cover.
2. Set the supporting air by turning the screw (1) on the concerning valve.
3. Check the supporting air on the blow tube by pressing the integrated key (2) of the valve.
4. Mount the cover.

5.13 Pneumatic Setting of the Table

If there are problems with the table during operation the pressure of the table can be measured and adjusted to the recommended value.

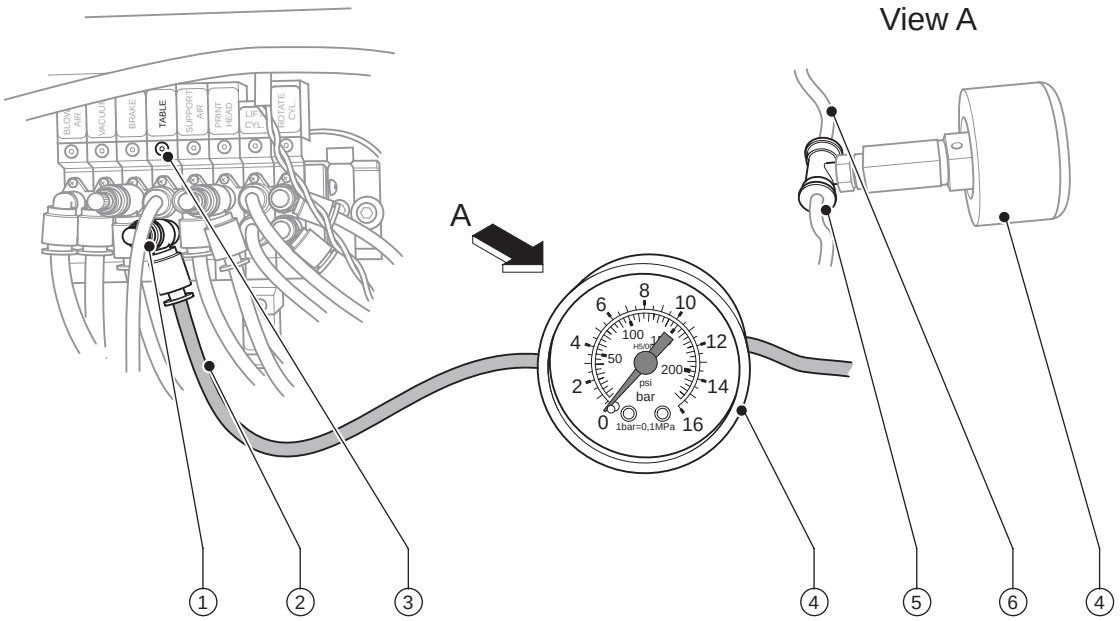


Figure 5t Setting the pressure on the table

1 Screw
2 Tube
3 Valve key table
4 Manometer
5 T-fitting
6 Tube

1. Switch off the printer, switch off the compressed air.
2. Remove the cover.
3. Pull the tube (2) out of the valve of the table and push it into the push-in T-fitting (5) of the manometer (4).
4. Push the tube (6) of the manometer (4) into the valve of the table.
5. Switch on the printer, switch on the compressed air.
6. Measure the value of the compressed air on the table.
7. If necessary set the compressed air value to the recommended value by turning the screw (1) on the valve.
   The recommended value is 2 bar.
8. Switch off the printer, switch off the compressed air.
9. Restore the normal tube connection.
10. Mount the cover.

5.14 Adjusting the Sensors of the Applicator Module

Normally the sensors are adjusted by the factory. But it can be necessary to adjust the sensors e.g. after replacing one of the sensors.

Adjusting the Sensor Turn/Lift Cylinder

The sensor checks the movement of the turn respective the lift cylinder.

PAM 3602:
Sensor (1) recognizes if the turn cylinder is in the 90°-position (away from the peel-off edge).

Sensor (2) recognizes if the turn cylinder is in the 180°-position (away from the peel-off edge).

PAM 3603:
Sensor (3) recognizes if the lift cylinder is in the position away from the peel-off edge.

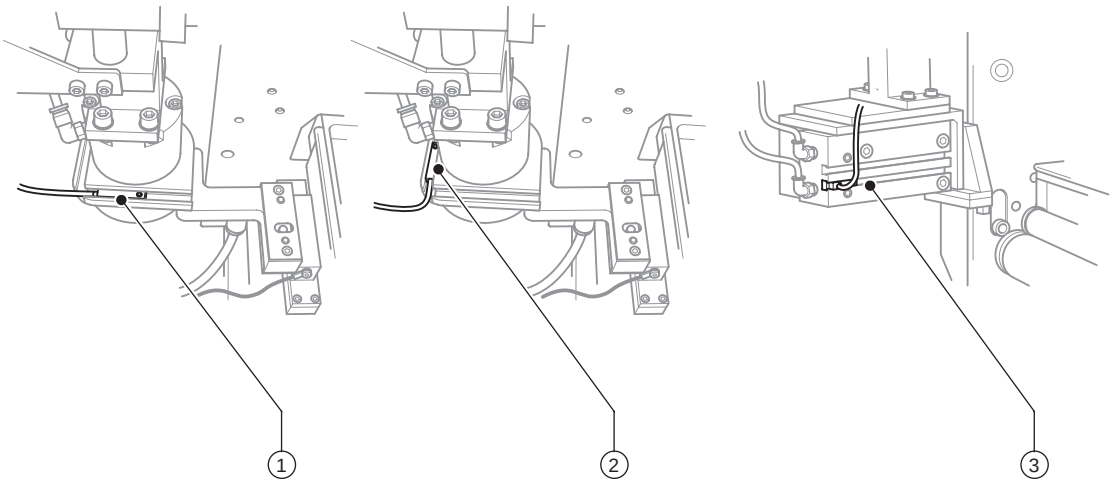


Figure 5u Adjusting the sensor turn/lift cylinder

1 Sensor turn cylinder PAM 3602 for 90°-position
2 Sensor turn cylinder PAM 3602 for 180°-position
3 Sensor lift cylinder PAM 3603

1. Switch off the compressed air.
2. Check the integrated LED of the respective sensor.
   The LED is switched on if the sensor (1, 2, 3) is adjusted correctly in his position.
3. If the sensor (1, 2, 3) is not adjusted correctly, loosen the screw on the sensor using a 1,2 mm allen key, slide the sensor until the LED is switched on and tighten the screw.
4. Move the pad manually and check if the LED is switched on and off correctly.
5. Repeat the adjustment if necessary.
6. Switch on the compressed air.

Adjusting the Labeling Position Sensor

This sensor checks if the main cylinder reaches the application position. If the pad is in the position to apply the label (lower end position) the integrated LED is switched on.

The labeling pressure for stamping the label onto the product can be altered by moving the labeling position sensor.

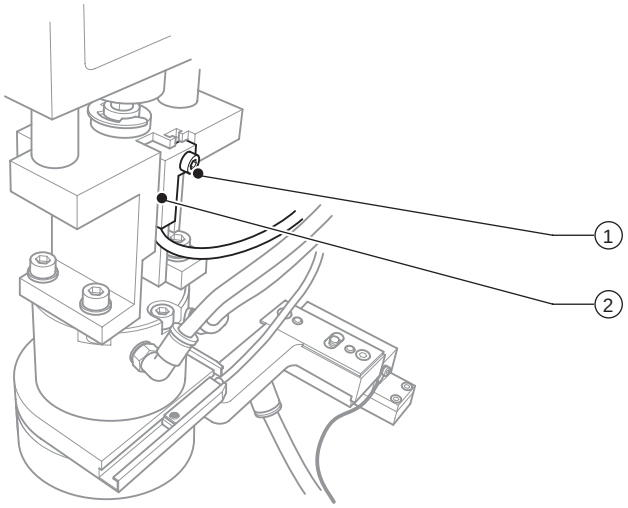


Figure 5v Adjusting the labeling position sensor

1 Screw
2 Sensor

1. Switch off the compressed air.
2. Loosen the screw (1).
3. Move the sensor (2).
   Moving the sensor (2) upwards will reduce the labeling pressure.
4. Tighten the screw (1).
5. Switch on the compressed air.

Adjusting the Sensor 1 Main Cylinder

The sensor checks if the main cylinder reaches its upper end position. If the sensor is adjusted exactly the integrated LED is switched on.

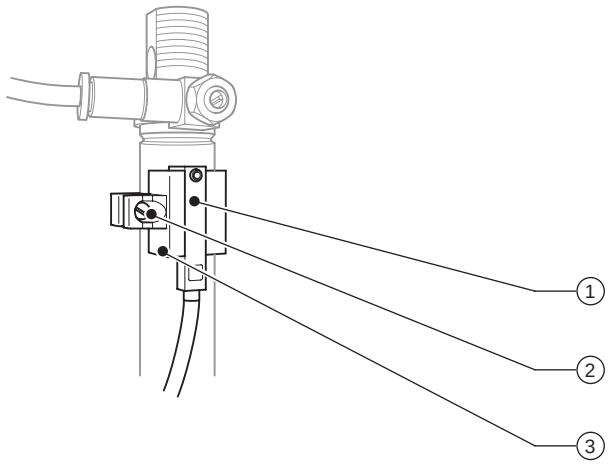


Figure 5w Adjusting the sensor 1 main cylinder

1 Sensor
2 Screw
3 Holder

1. Switch off the compressed air.
2. Check the integrated LED.
   The LED is switched on if the sensor (1) is adjusted correctly in the upper end position.
3. If the sensor (1) is not adjusted correctly, loosen the screw (2) of the holder (3), slide the holder until the LED is switched on and tighten the screw (2).
4. Slide the manual valve on the applicator to the bleed position.
5. Move the cylinder manually and check if the LED is switched on and off correctly.
6. Repeat the adjustment if necessary.
7. Slide the manual valve on the applicator to the operate position.
8. Switch on the compressed air.

Adjusting the Sensors 2 Main Cylinder (PAM 3602 only)

There are two sensors 2 main cylinder to check if the pad reaches the intermediate position correctly. At the intermediate position the turn cylinder carries out the swing movement of the pad. It is very important that the pad swings without damage. For that reason the area for the swing movement has to be free.
The upper sensor recognizes this position during the movement downward and the lower sensor during the movement upward.

If the sensors are adjusted correct the integrated LED of the corresponding sensor is switched on and off during the cylinder movement.

The sensors have to adjust corresponding to the special requirements.

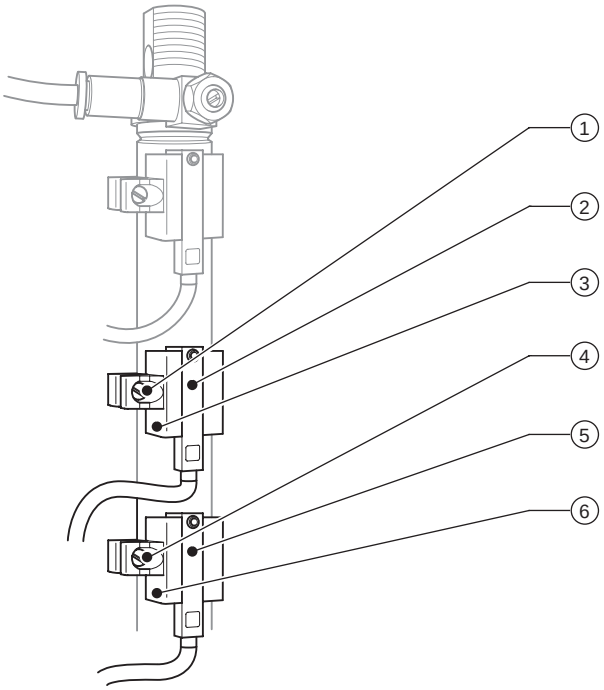


Figure 5x Adjusting the sensors 2 main cylinder

1 Screw
2 Upper sensor
3 Holder
4 Screw
5 Lower sensor
6 Holder

1. Switch off the compressed air.
2. Slide the manual valve on the applicator to the bleed-position.
3. Move the cylinder manually downward.
   Check on which position it is possible to swing the pad without collision with the putting up area or any other components.
4. Adjust the upper sensor (2) by loosen the screw (1) and sliding the holder (3) into the required position so, that the sensor could recognize this position. Tighten the screw (1).
5. Move the cylinder up and down and check if the LED integrated in the sensor (2) is switched on and off.
6. Move the cylinder manually upward.
   Check on which position it is possible to swing the pad without collision with the putting up area or any other components.
7. Adjust the lower sensor (5) by loosen the screw (4) and sliding the holder (6) into the required position so, that it could recognize this position.
8. Move the cylinder up and down and check if the LED integrated in the sensor (5) is switched on and off.
9. Slide the manual valve on the applicator to the operate position.
10. Switch on the compressed air.
11. Release a labeling process by alternately pressing the "feed" key and the pre-dispense key on the printer.
12. Check the movement of the main and the turn cylinder and if the integrated LEDs are switched on and off.
13. Readjust the respective sensor if necessary.
    The upper sensor (2) checks the Stop during the movement downward,
    The lower sensor (5) checks the Stop during the movement upward.

6 Problem Solution

6.1 Errors During Printing

Error	Cause and Solution
The printer has a print job but does not print	1. The input signals to start the print of every single label is not connected or not used; check the connections at the PLC interface.
Transfer ribbon wrinkles	1. Printhead balance is not correctly adjusted; re-adjust the printhead balance (see Operator‘s Manual). 2. Transfer ribbon is too wide; use transfer ribbon which is max. 10% wider than the label media. 3. Not enough ribbon tension; check tension at ribbon supply hub.
Printed image has smears or voids.	1. Printhead is dirty; clean the printhead. 2. Temperature too high; reduce heat setting using software. 3. Unsuitable ribbon/label combination; choose a different transfer ribbon.
Printed image is lighter on one side.	1. Printhead is dirty; clean the printhead. 2. Printhead is out of alignment; re-align the printhead. 3. Printhead balance is not correctly adjusted; re-adjust the printhead balance (see Operator‘s Manual).
Printed image is too light after replacing the printhead.	1. Printhead out of adjustment; re-adjust printhead. 2. Printhead parameter set incorrectly; change heat level in the setup.
Printer does not stop after transfer ribbon runs out.	1. Printer is set to direct thermal printing, choose transfer printing mode in the software.
Printer does not print; error message "Out of Paper" or "No label found"	1. Labels not fed through label edge sensor, load labels correctly. 2. Label edge sensor dirty, clean label edge sensor. 3. Label edge sensor is not adjusted (f.e. after replacing the CPU PCB); carry out the adjustment. 4. Label edge sensor defective, replace sensor. 5. Swing arm in upper end position, since the release spring for swing arm is misadjusted, re-adjust the release spring. 6. Swing arm in upper end position, since label roll is not locked at the media unwinder. Lock the label roll using the adapters.
Printer moves label stock, but transfer ribbon does not move.	1. Transfer ribbon loaded incorrectly; check if coated side is facing towards the labels. 2. Unsuitable ribbon/label combination, leads to insufficient friction between labels and ribbon; choose different transfer ribbon. 3. Torques at the ribbon hubs are misadjusted, re-adjust the torques.
Printer prints sequence of characters instead of label format.	1. Printer in monitor (ASCII dump) mode; quit this mode by pressing the CANCEL key.
Printer prints every second label.	1. Label height setting in software is too large; correct setting.
Vertical white lines in the printed image.	1. Printhead is dirty; clean the printhead. 2. Printhead defective (failure of heating elements); replace printhead.
Error message ”Out of ribbon” although ribbon is still available.	1. Transfer ribbon roll is not locked to the take up hub; take up does not turn; tighten the roll at the hub.
Printhead is not in its upper position; error message "Head not up" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor printhead cylinder not adjusted, adjust it. 3. Sensor printhead cylinder defective, replace it. 4. Applicator control PCB defective, replace it.
Printhead is not in its lower position; error message "Head not down" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor printhead cylinder not adjusted, adjust it. 3. Sensor printhead cylinder defective, replace it. 4. Applicator control PCB defective, replace it.
Table is not in its rear position; error message "Table not in rer" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor peel-off table not adjusted, adjust it. 3. Sensor peel-off table defective, replace it. 4. Applicator control PCB defective, replace it.

Error	Cause and Solution
Table is not in its front position; error message "Table not in frt" is shown in the display..	1. Loss of compressed air, check all connections. 2. Sensor peel-off table not adjusted, adjust it. 3. Sensor peel-off table defective, replace it. 4. PCB applicator control defective, replace it.
PAM 3602: Turn cylinder has not left the 90°/180°-position. PAM 3603: Small lift cylinder has not left the retracted position. Error message "Nozzle 0° error" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor turn/lift cylinder defective, replace it. 3. PCB applicator control defective, replace it.
PAM 3602: Turn cylinder has not reached the 90°/180°-position. PAM 3603: Small lift cylinder has not reached the retracted position. Error message "Nozzle 90° error" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor turn/lift cylinder not adjusted, adjust it. 3. Sensor turn/lift cylinder defective, replace it. 4. Applicator control PCB defective, replace it.
Pad has not reached the upper end position; error message "Upper position" is shown in the display.	1. Loss of compressed air, check all connections. 2. Sensor 1 main cylinder not adjusted, adjust it. 3. Sensor 1 main cylinder defective, replace it. 4. Applicator control PCB defective, replace it.
Pad has not reached the labeling position; error message "Lower position" is shown in the display.	1. Loss of compressed air, check all connections. 2. Labeling position sensor not adjusted, adjust it. 3. Labeling position sensor defective, replace it. 4. Applicator control PCB defective, replace it.
Insufficient vacuum on pad	1. Loss of compressed air, check all connections. 2. In cyclical operation, the vacuum control valve is not controlled (red LED in the valve "Vacuum" on the valve terminal does not light up); applicator control PCB defective, replace PCB. 3. No sufficient vacuum at the outlet of the vacuum generator; vacuum generator/silencer on vacuum generator dirty/defective; clean or replace vacuum generator/silencer. 4. No sufficient vacuum at the outlet of the vacuum tube; vacuum tube defective, replace vacuum tube. 5. No sufficient vacuum at the pad; suction holes or channels on the pad blocked, clean pad.
Fault in cylinder movement	1. In cyclical operation the cylinder control valves are not controlled (red LEDs in valves do not light up). 2. Applicator control PCB defective; replace PCB. 3. Cylinder movement not switched over despite intact applicator control PCB; cylinder control valve defective, replace control valve. 4. Cylinder movement is very slow; throttle valves are defective or badly out of adjustment, replace or readjust the valves.
Error in the transfer of the label to the pad; error message "Vacuum plate empty" is shown in the display.	1. Incorrect setting of the pad in the upper end position; readjust the pad height or the rotary movement of the pad. 2. Incorrect setting of the supporting air; readjust the blow tube and the supporting air throttle valve. 3. Incorrect setting of the peel-off-offset; readjust offset.

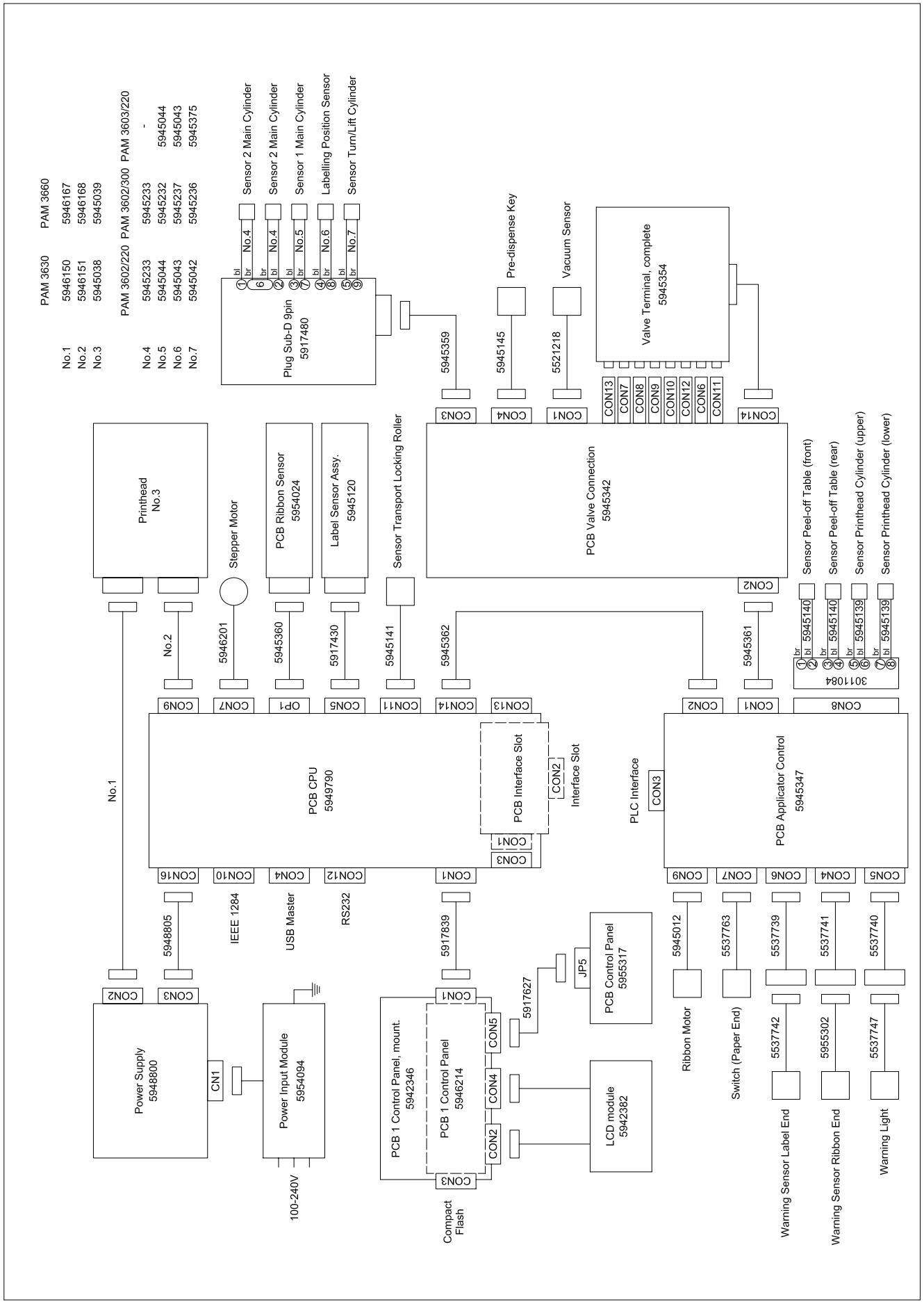
6.2 Failure of Device Functions

Error	Possible Solutions
No movement of material	1. Mechanical check of the gears and belts, replace damaged gears or belts. 2. Replace CPU PCB. 3. Replace stepper motor.
No printing (no printed image)	1. Check the printhead cable, re-seat if necessary. 2. Check printhead cable for damage, replace printhead cable if necessary. 3. Replace printhead. 4. Replace CPU PCB.
No display and navigator pad function	1. Check whether LED1 (green) on CPU PCB is on. If LED1 is off --> Power unit or CPU PCB is defective. If LED1 flashes --> Firmware update has failed; load firmware file via Centronics interface. 2. Check cable connection between CPU PCB and PCB Control Panel. 3. Check voltages 3 V and 5 V at the measuring points on CPU PCB. If both voltages are off --> Power unit could be defective. If only one voltage is off --> CPU PCB could be defective. 4. Replace PCBs Control Panel.
No display function (navigator pad okay)	1. Check cable connection between LCD module and PCB 1 Control Panel. 2. Replace LCD module. 3. Replace PCB 1 Control Panel.
No navigator pad function (display okay)	1. Check cable connection between PCB 1 Control Panel - PCB Control Panel. 2. Replace PCB Control Panel. 3. Replace PCB 1 Control Panel.
No I/O functions	1. Check if printer port and computer port are configured identically, configure ports if necessary. 2. For Ethernet connection, check whether IP address and SubNet-mask are correct. 3. Check interface cable, replace bad I/O cable. 4. If function of the PLC port fails, replace PCB applicator control. 5. If function fails completely, replace CPU PCB.
No function of applicators	1. Check, if the applicator is activated in the setup. 2. Check cables between CPU PCB, applicator control PCB, PCB valve connection and the 9-pin applicator connector. Replace cables if necessary. 3. Replace applicator control PCB. 4. Replace CPU PCB.
No function of the warning sensors	1. Check the sensor function at the LED inside the sensor. 2. Check the sensor cables. Replace cables if necessary. 3. Check the reflective foils. Replace the foils if necessary. 4. Check, if the sensor holder are bended. Replace the sensor holders if necessary. 5. Check the sensors. Replace the sensors if necessary. 6. Replace applicator control PCB.

6.3 Permanently Displayed Hardware Errors

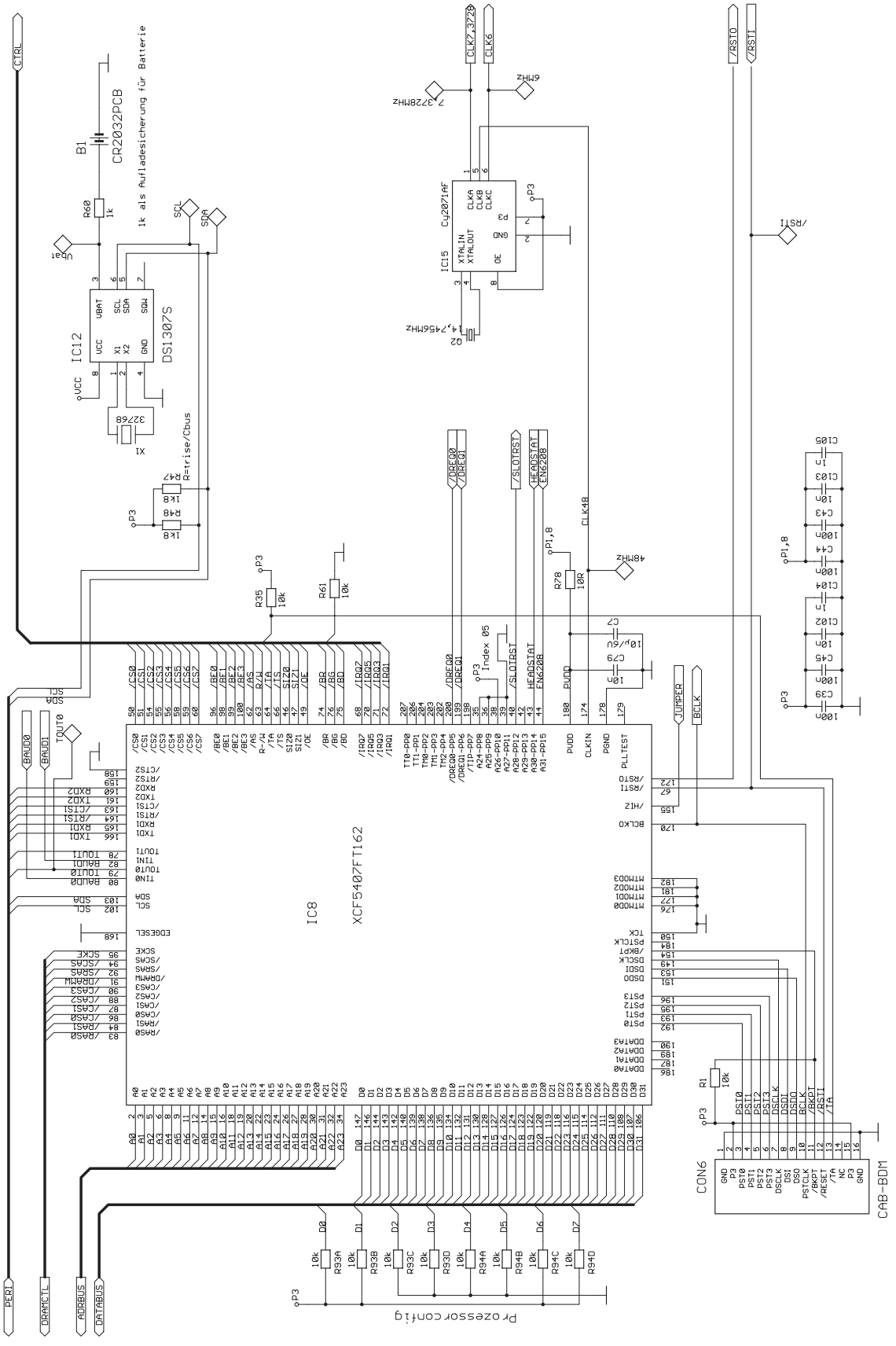
Error Message	Possible Solutions
ADC malfunction	Error of CPU PCB; replace PCB.
dRAM malfunction	Error of CPU PCB; replace PCB.
FPGA malfunction	Error of CPU PCB; replace PCB.
Head open	Error of sensor transport locking roller; check sensor, adjust switch lever, replace sensor if necessary.
Invalid setup	Error of CPU PCB; carry out a firmware update, replace PCB.
ROM malfunction	Error of CPU PCB; replace PCB.
Voltage error V_{BAT}	Battery voltage on CPU PCB too low; replace CPU PCB.
Voltage error V_{MOT}	Motor voltage too low; Check voltage at measuring point (see page C-2), if voltage is too low --> replace power unit, if voltage is okay --> replace CPU PCB.
Voltage error 24V	24 V too low; check voltage at measuring point P24 (see page C-2) if voltage is too low --> replace power unit, if voltage is okay --> replace CPU PCB.
Voltage error 24V ext.	24 V at the peripheral connector too low; remove peripheral device (applicator), if the error still occurs --> replace CPU PCB, if the error disappears --> peripheral device defective.
Voltage error 5V ext.	5 V at the Centronics interface too low; an interface converter with a current consumption which is too high may have been connected; remove interface converter, if the error still occurs --> replace CPU PCB, if the error disappears --> unsuitable interface converter.

Appendix A: Block Diagram

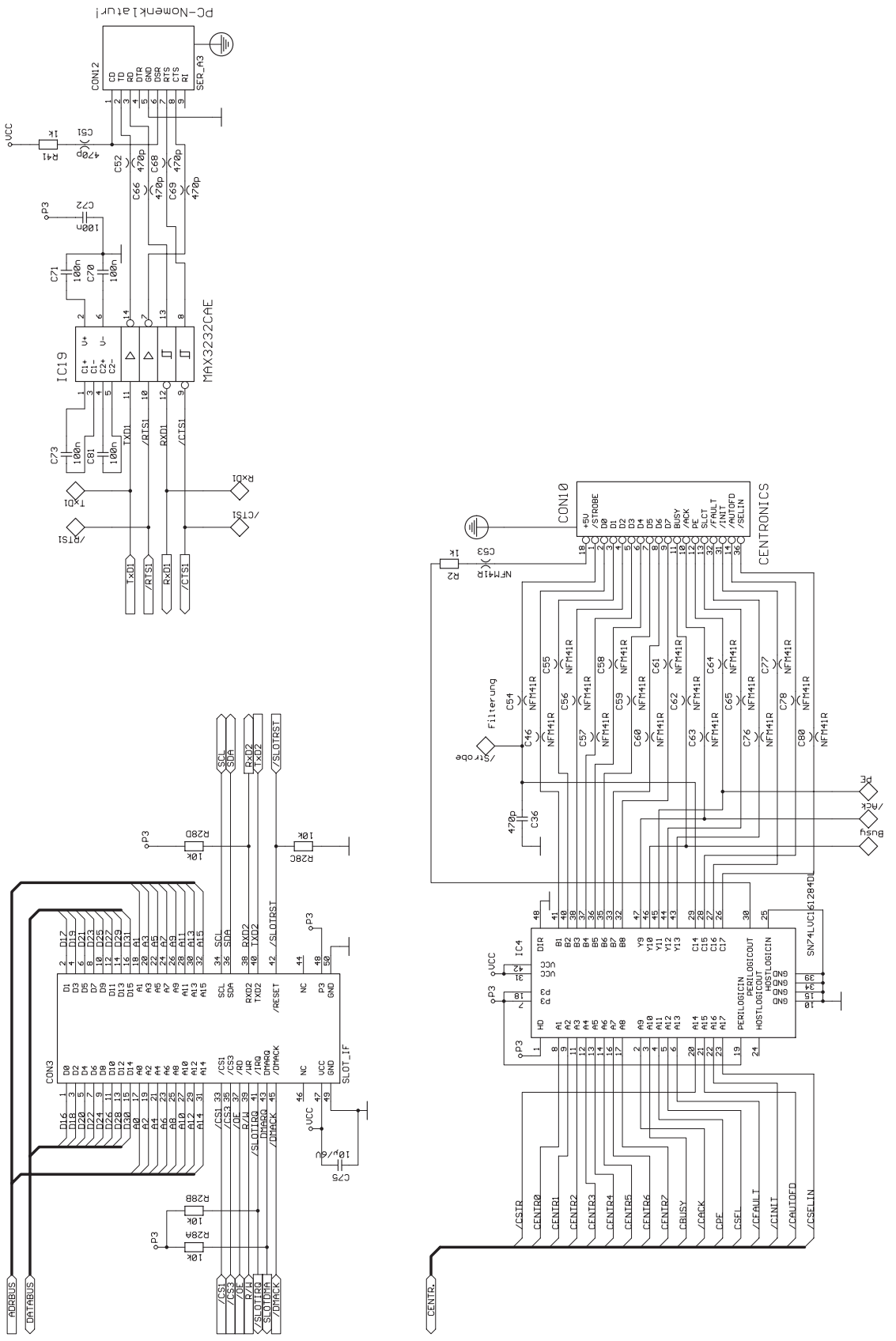


Appendix B: Circuit Diagrams

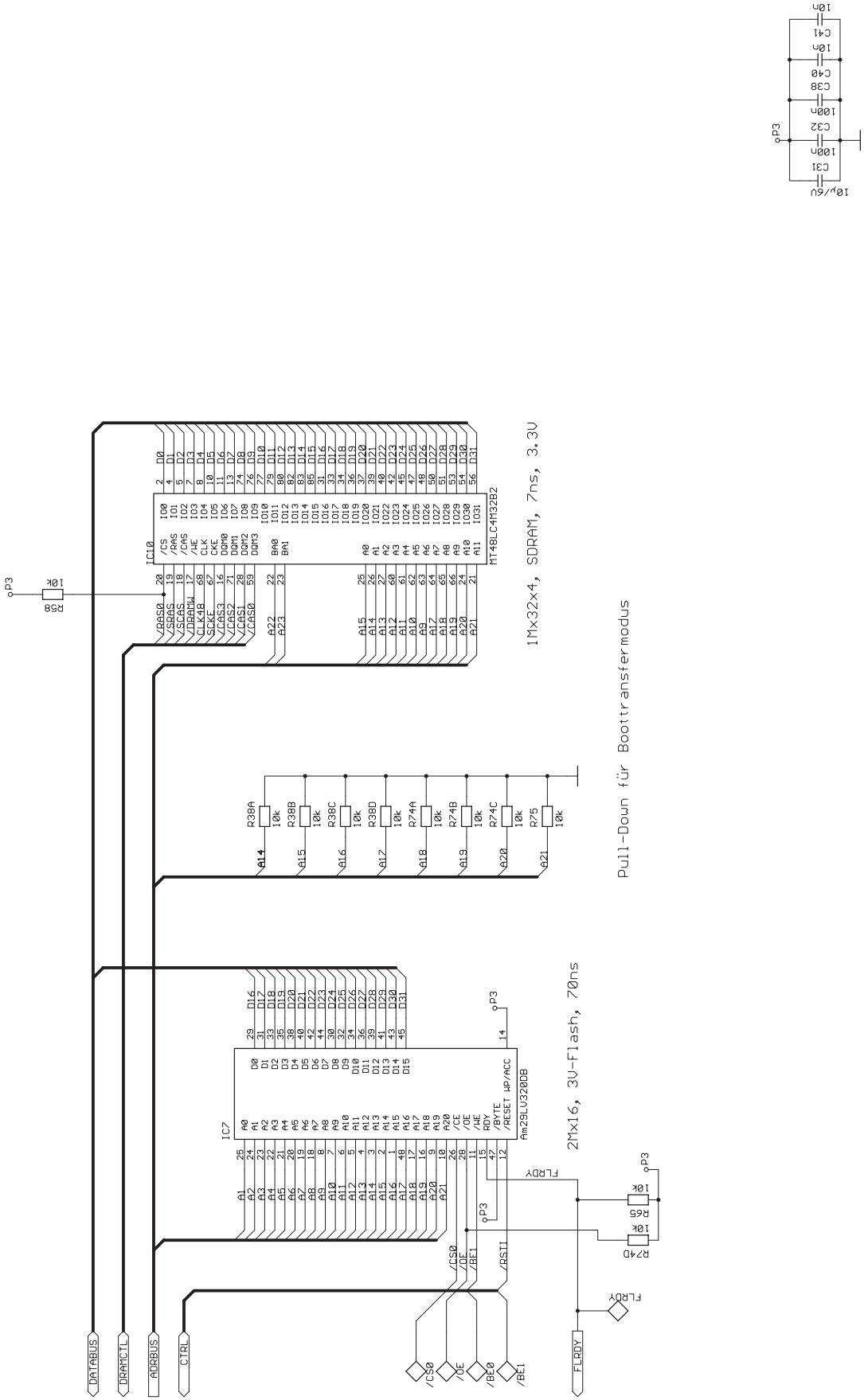
PCB CPU: CPU, Clock Timer, Clock, BDM



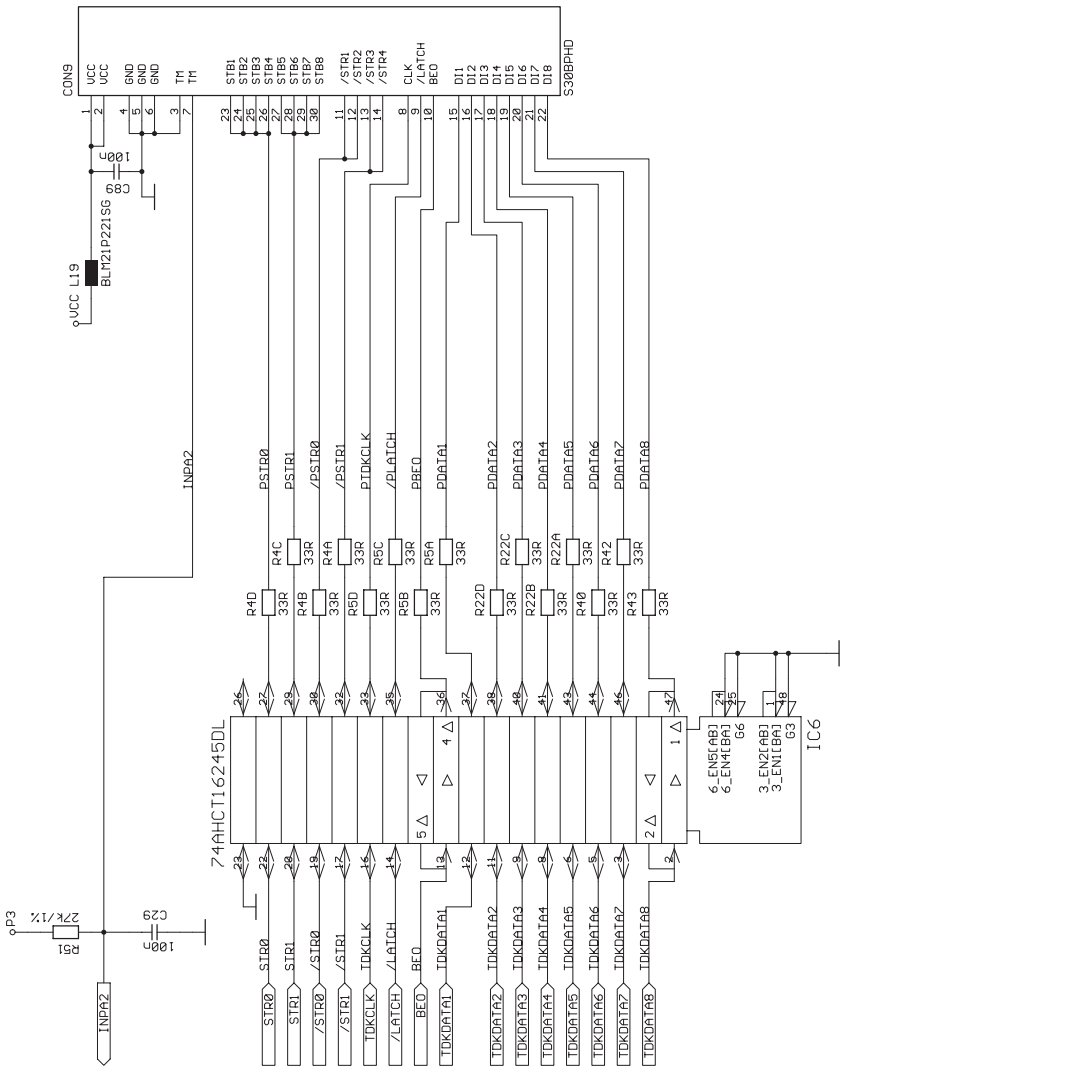
PCB CPU: Centronics, Interface Slot, RS-232

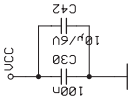


PCB CPU: dRAM, Flash

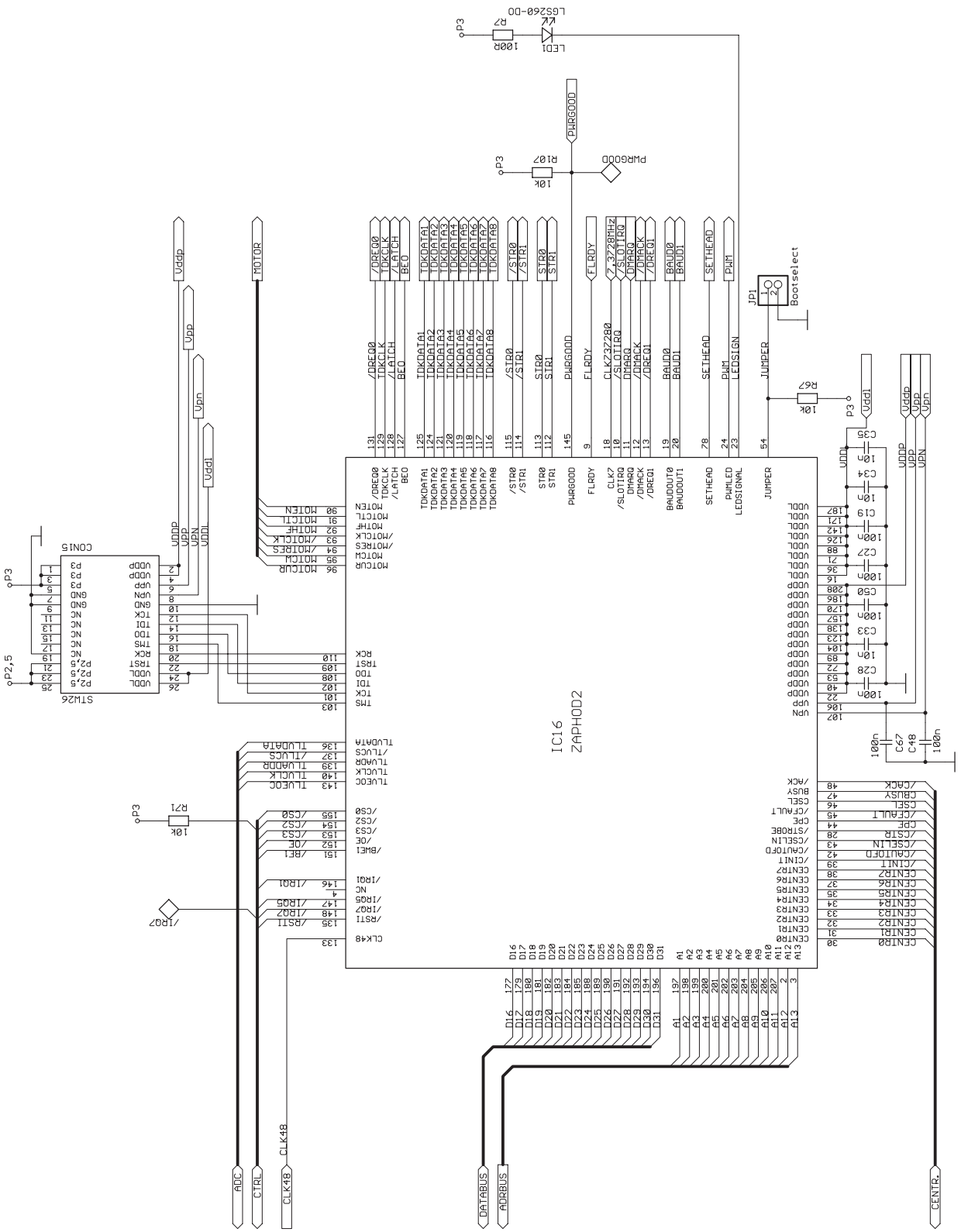


PCB CPU: Printhead Connection

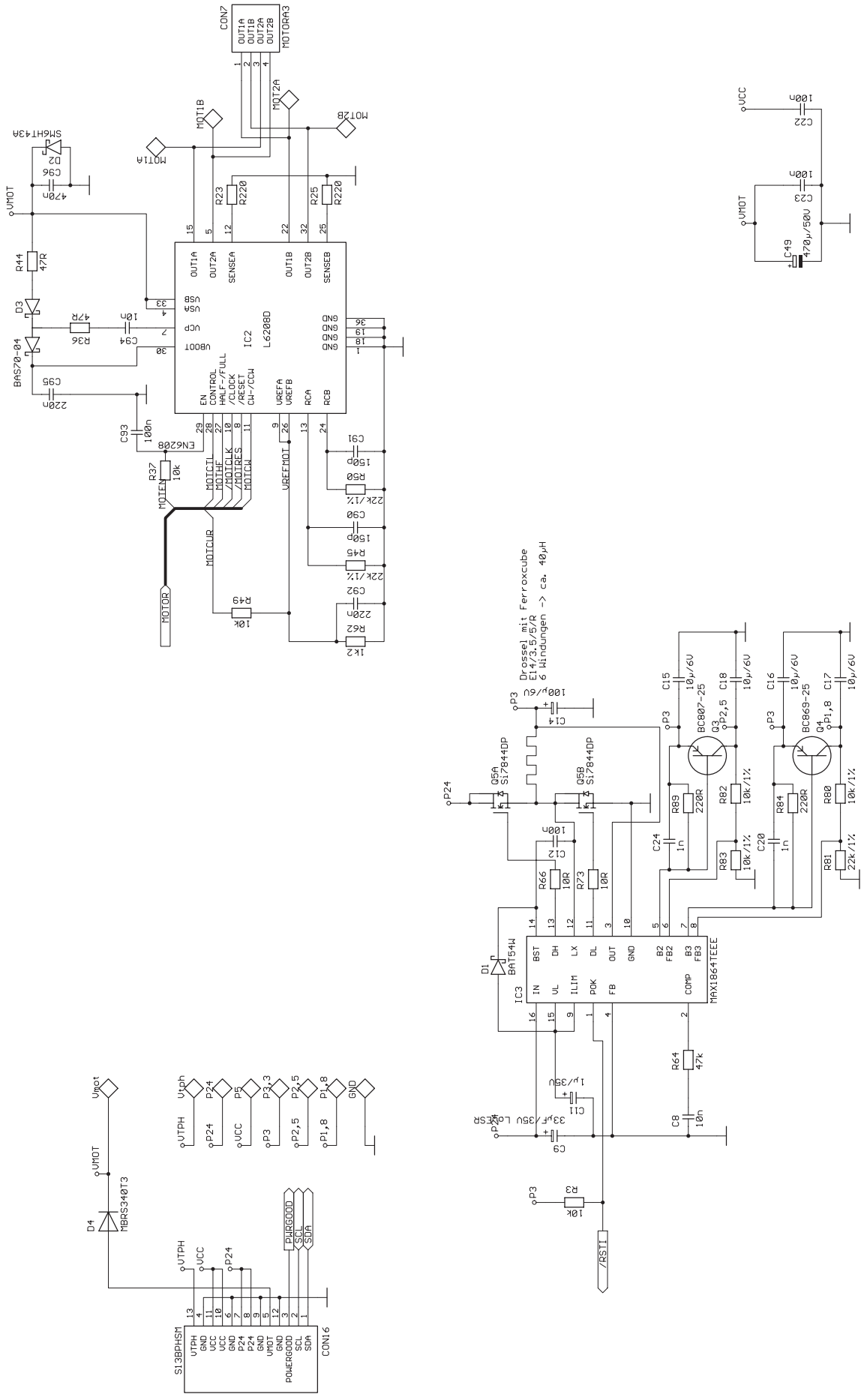




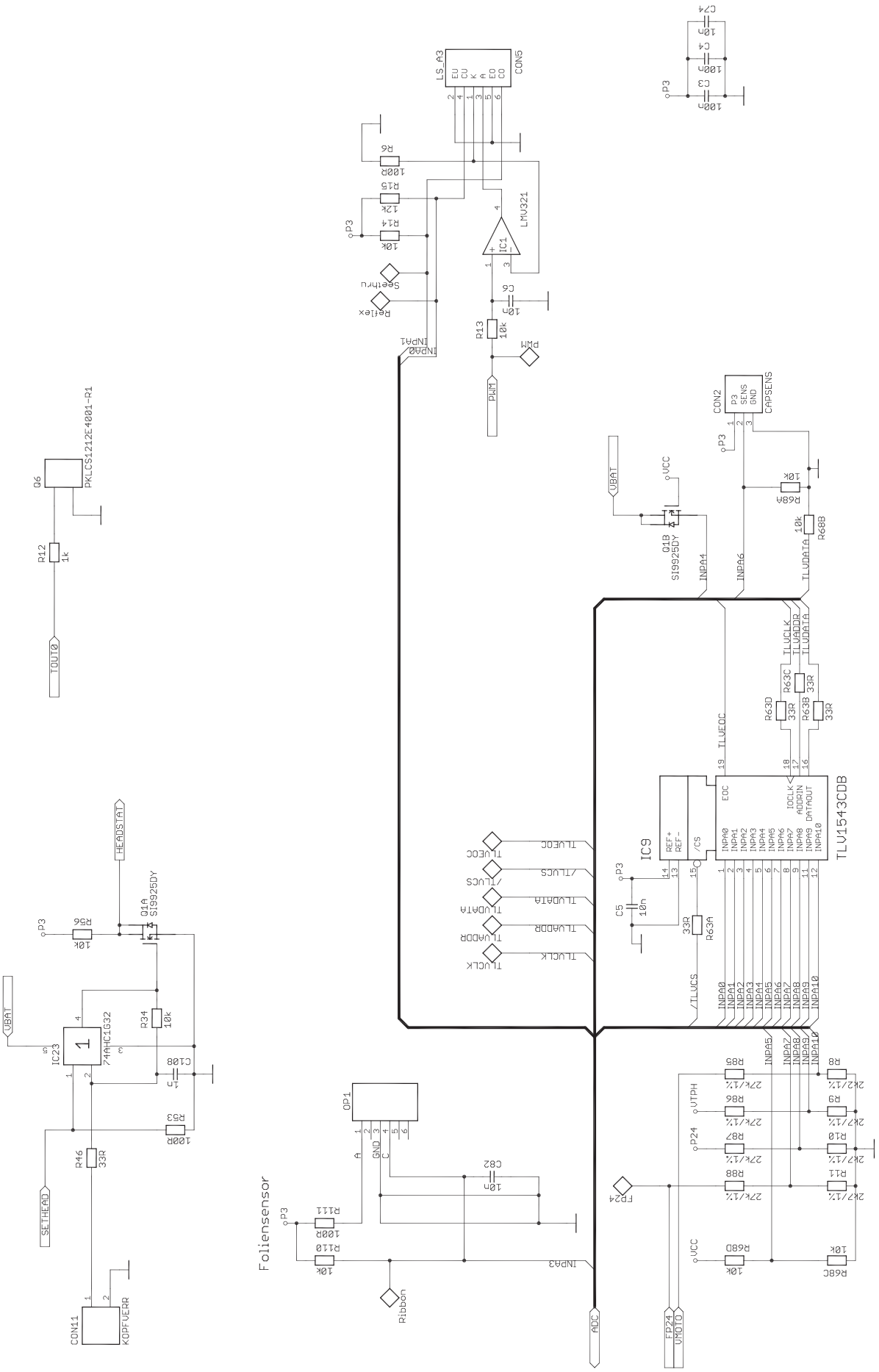
PCB CPU: FPGA, History RAM



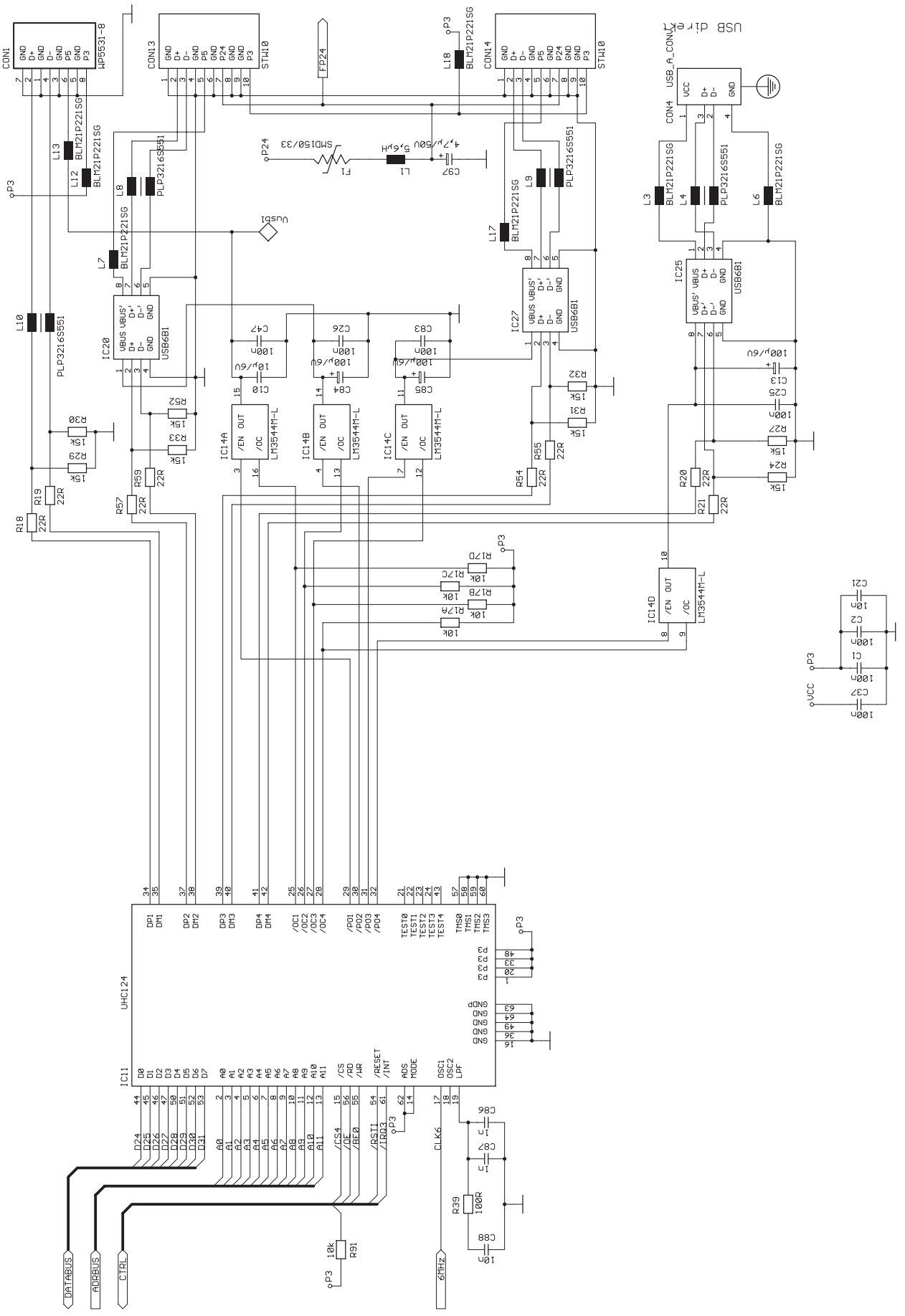
PCB CPU: Power Supply, Motor Driver



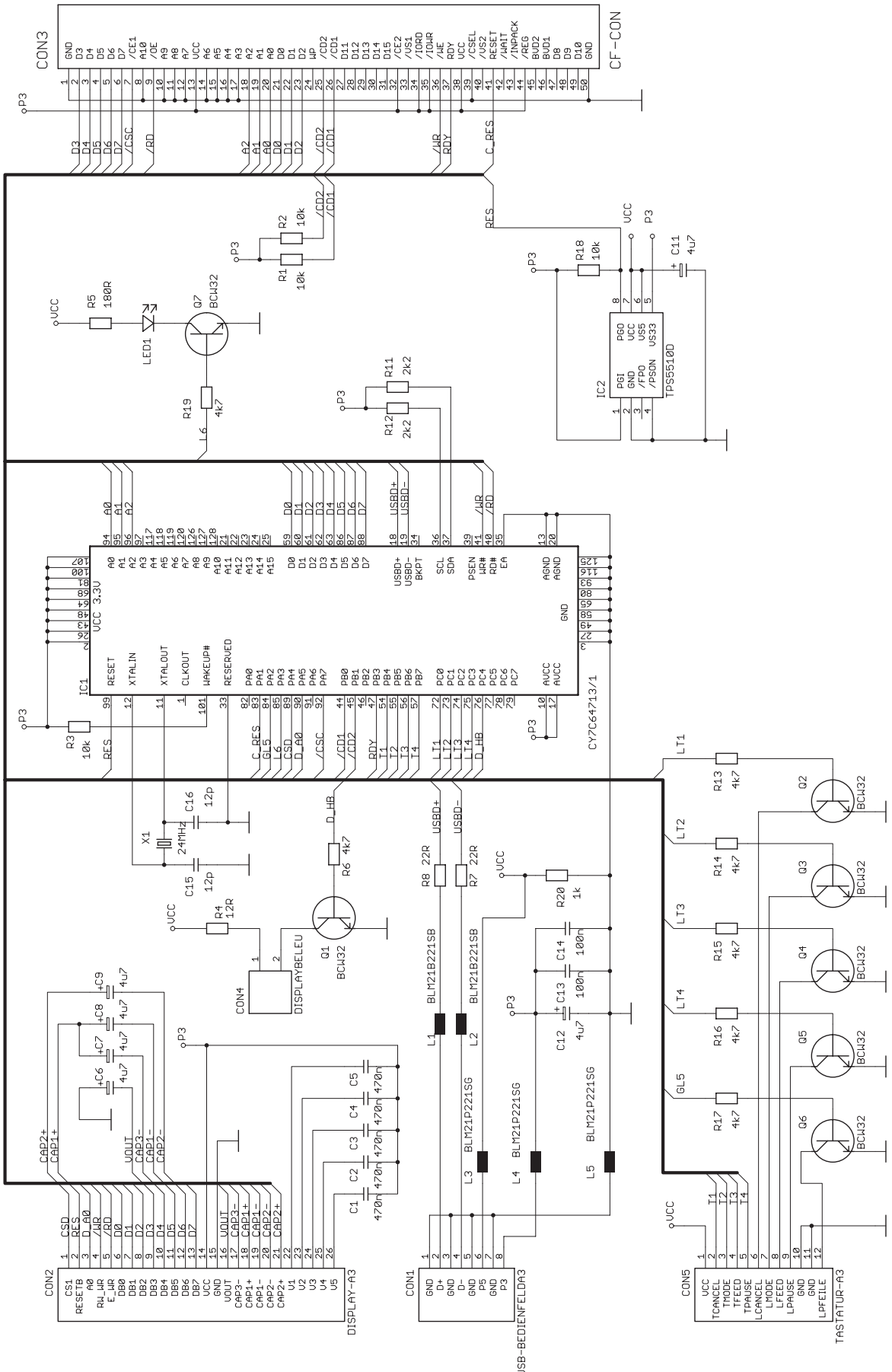
PCB CPU: Sensors, AD Converter



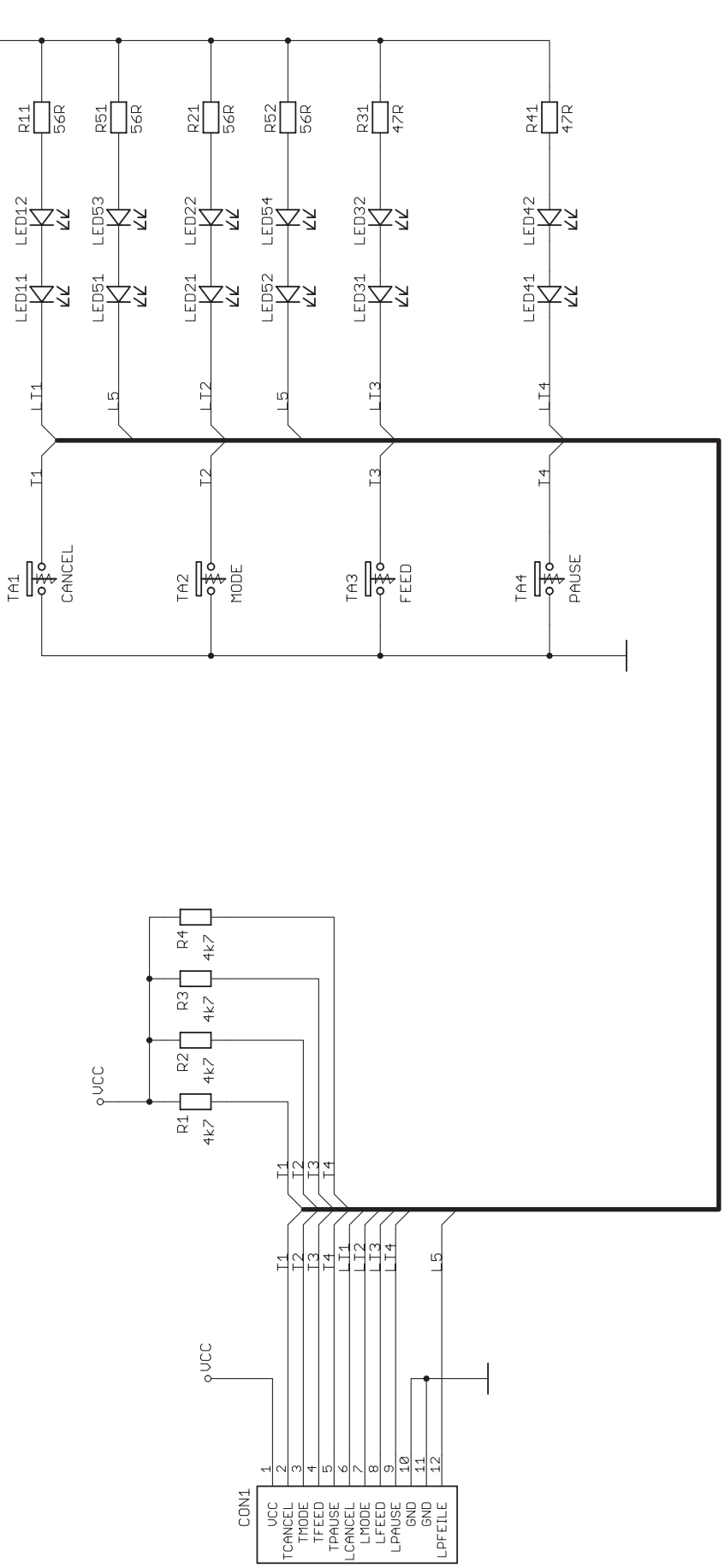
PCB CPU: USB Host



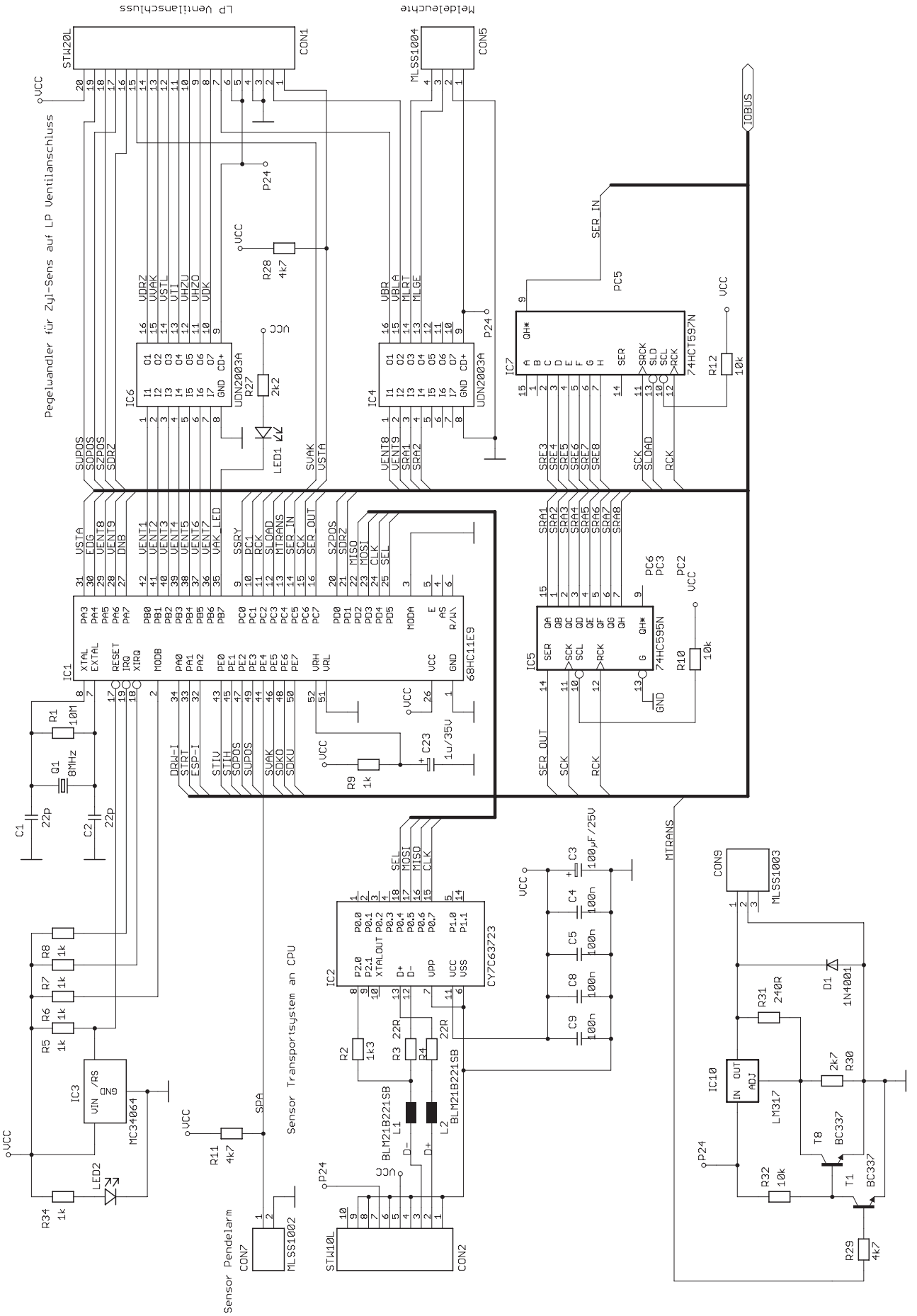
PCB 1 Control Panel



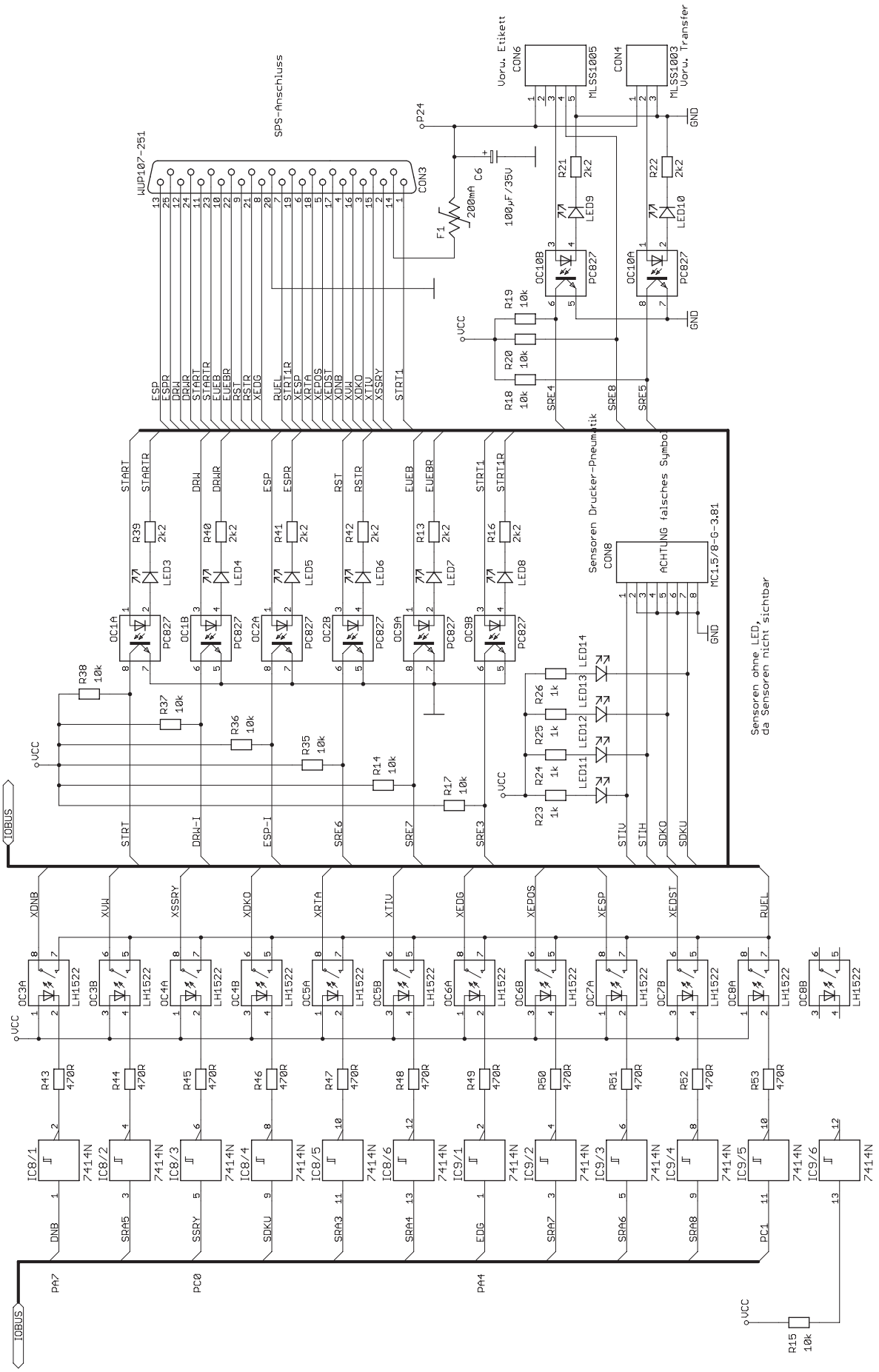
PCB Control Panel



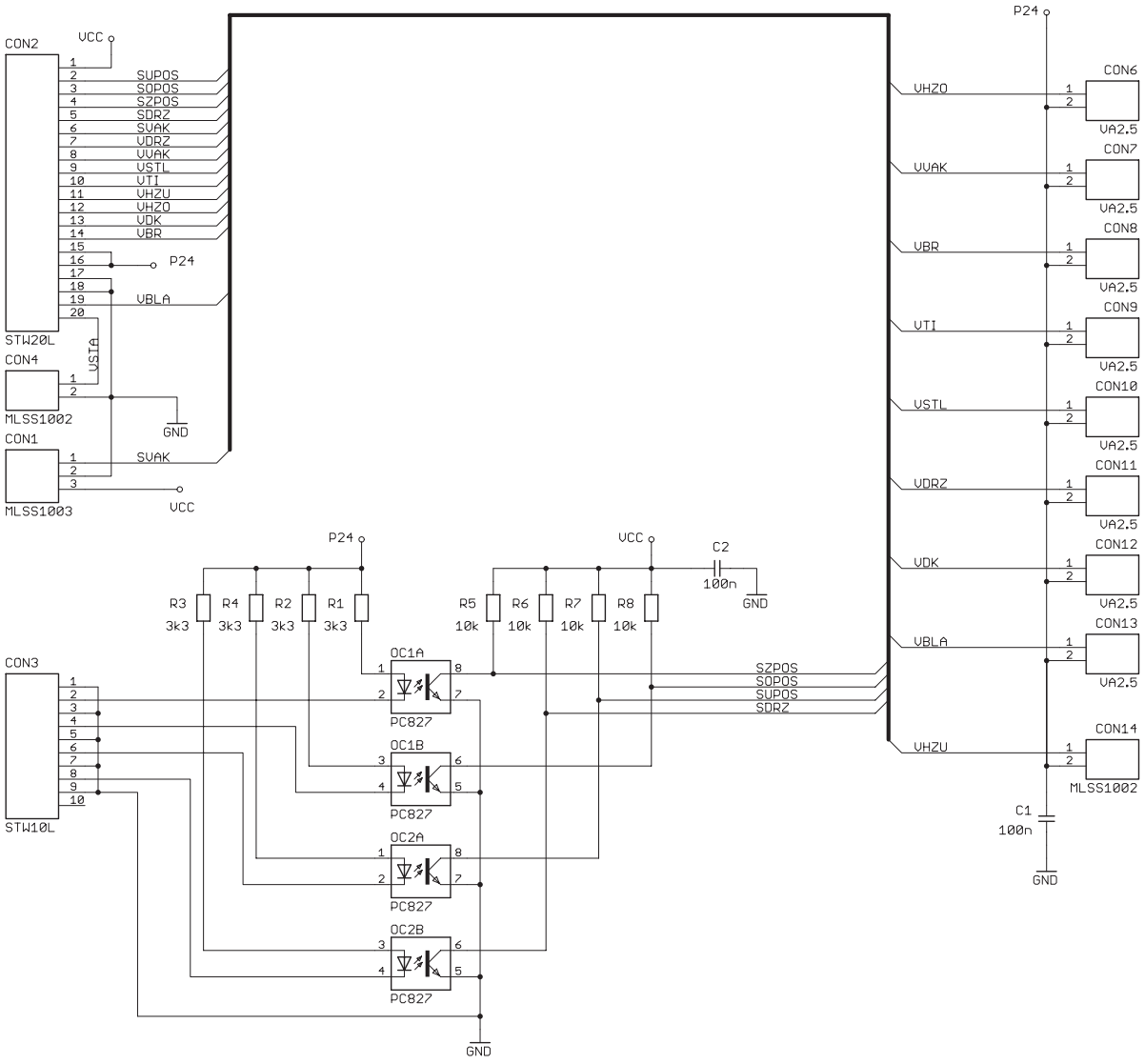
PCB Applicator Control: Controller



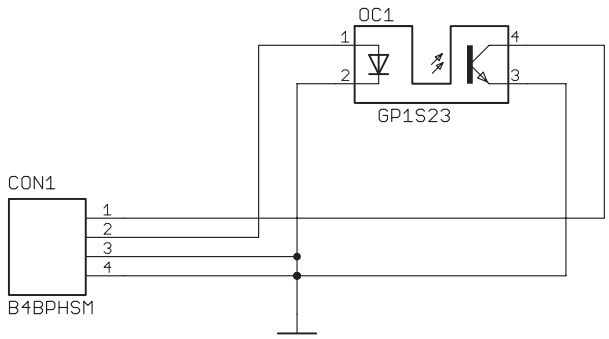
PCB Applicator Control: Inputs/Outputs



PCB Valve Connection

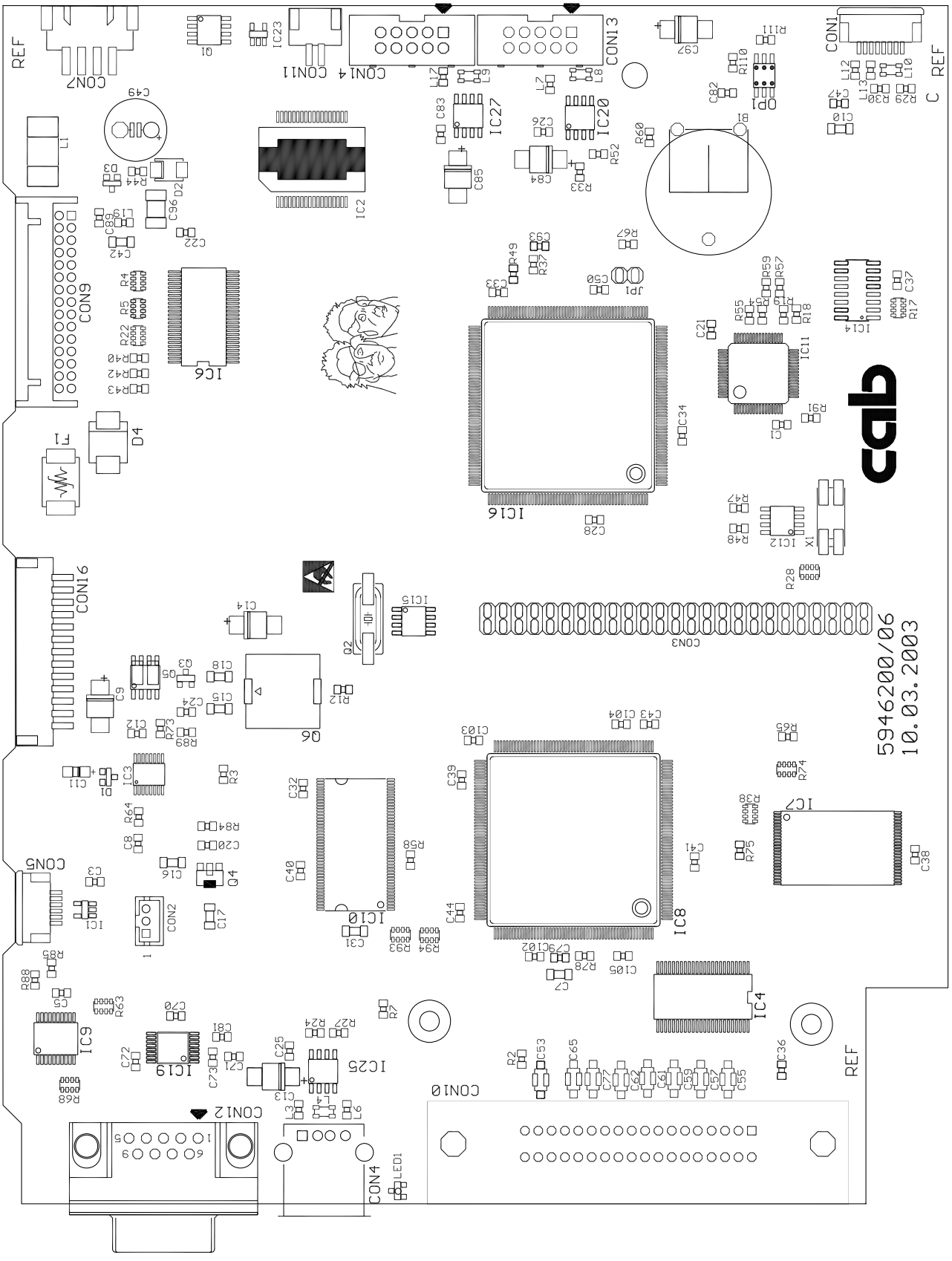


PCB Ribbon Sensor



Appendix C: Layout Diagrams

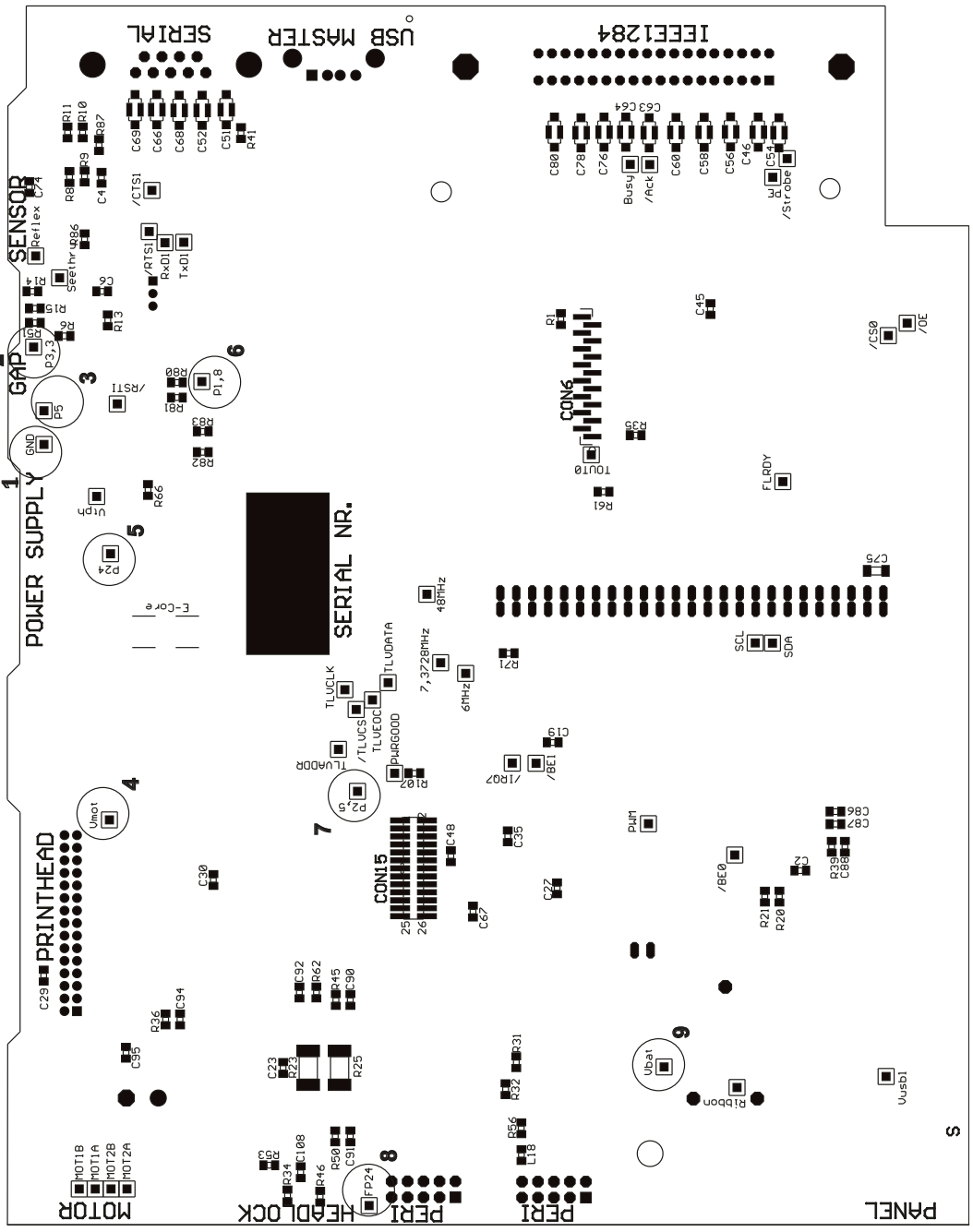
PCB CPU: Components side



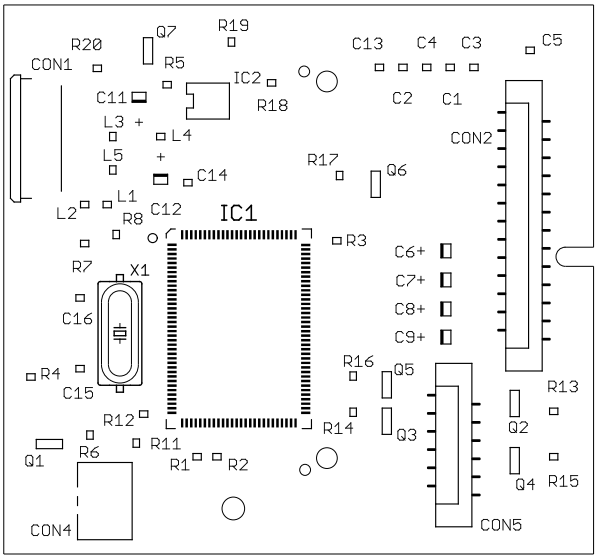
PCB CPU: Soldering side

Important Measuring Points

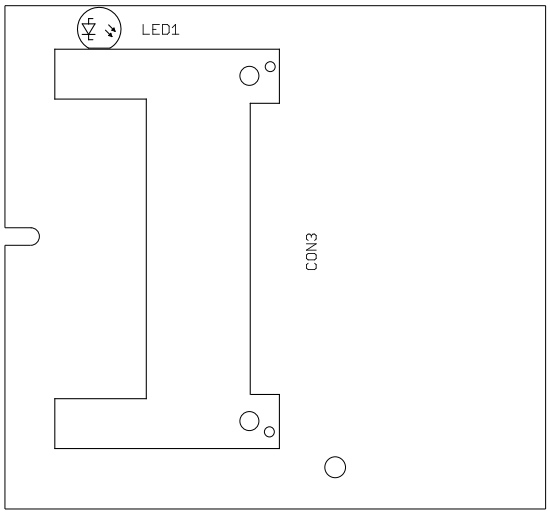
1 - GND
2 - 3,3 V
3 - 5 V
4 - V_{MOT}
5 - 24 V
6 - 1,8 V
7 - 2,5 V
8 - 24 V ext. (Peripherals)
9 - V_{BAT}



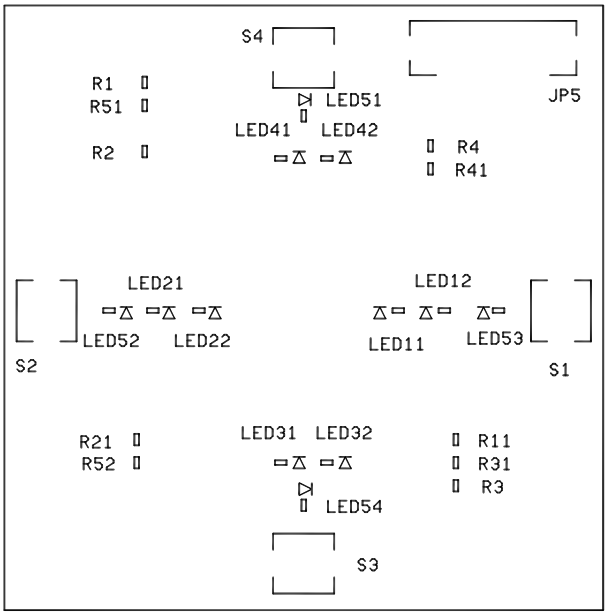
PCB 1 Control Panel: Components side



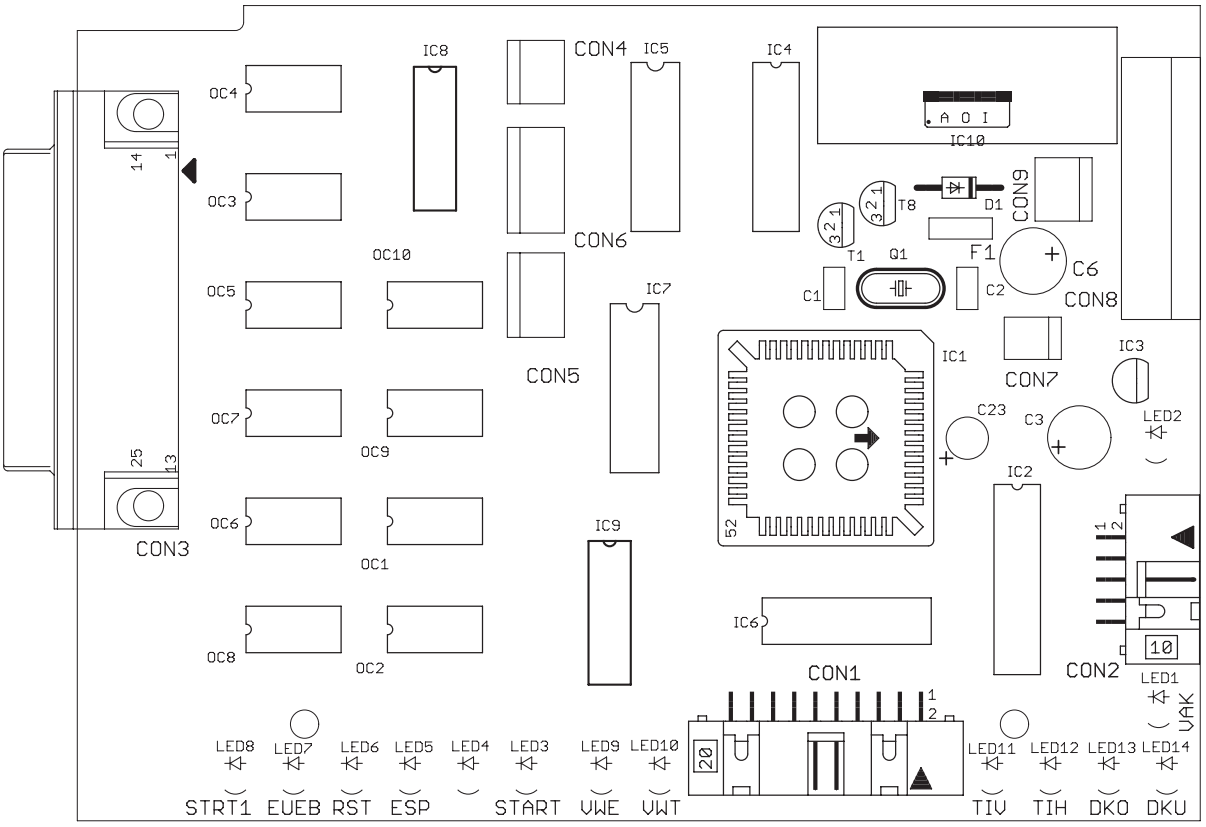
PCB 1 Control Panel: Soldering side



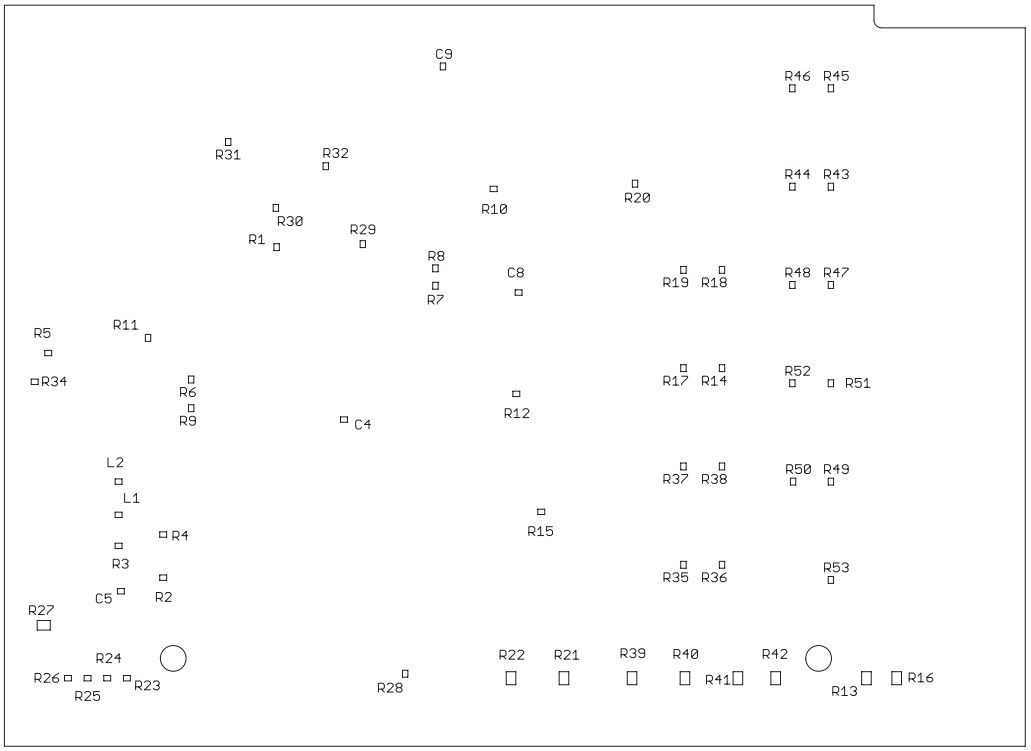
PCB Control Panel



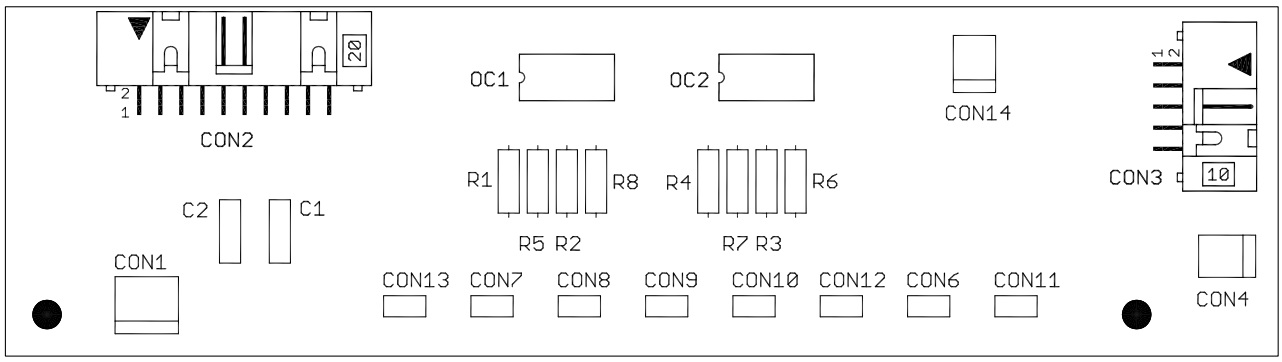
PCB Applicator Control: Components side



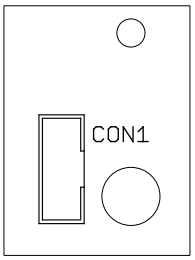
PCB Applicator control: Soldering side



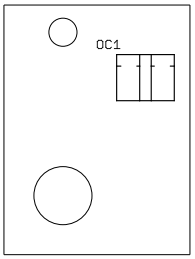
PCB Valve Connection



PCB Ribbon Sensor: Components side

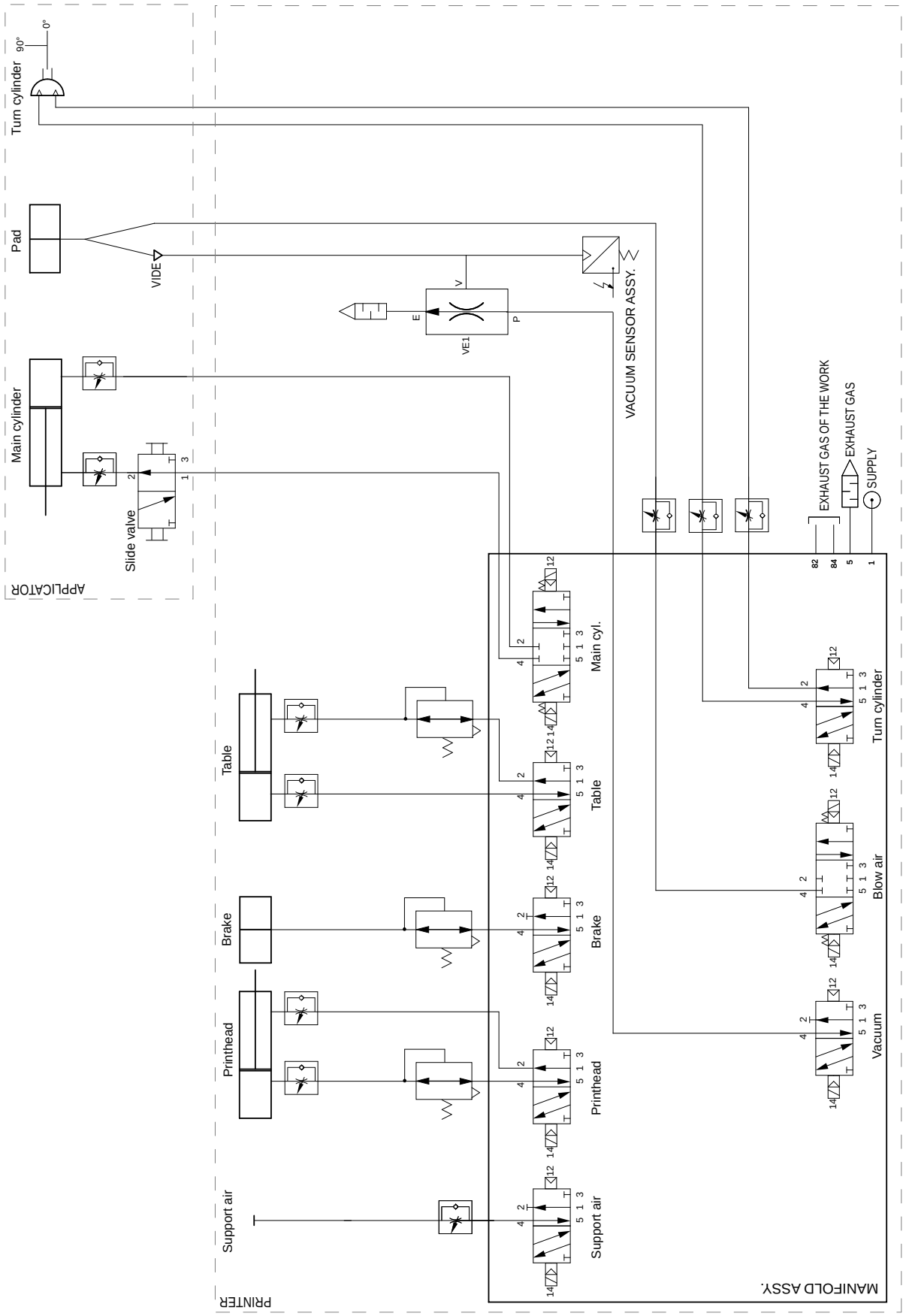


PCB Ribbon Sensor: Soldering side

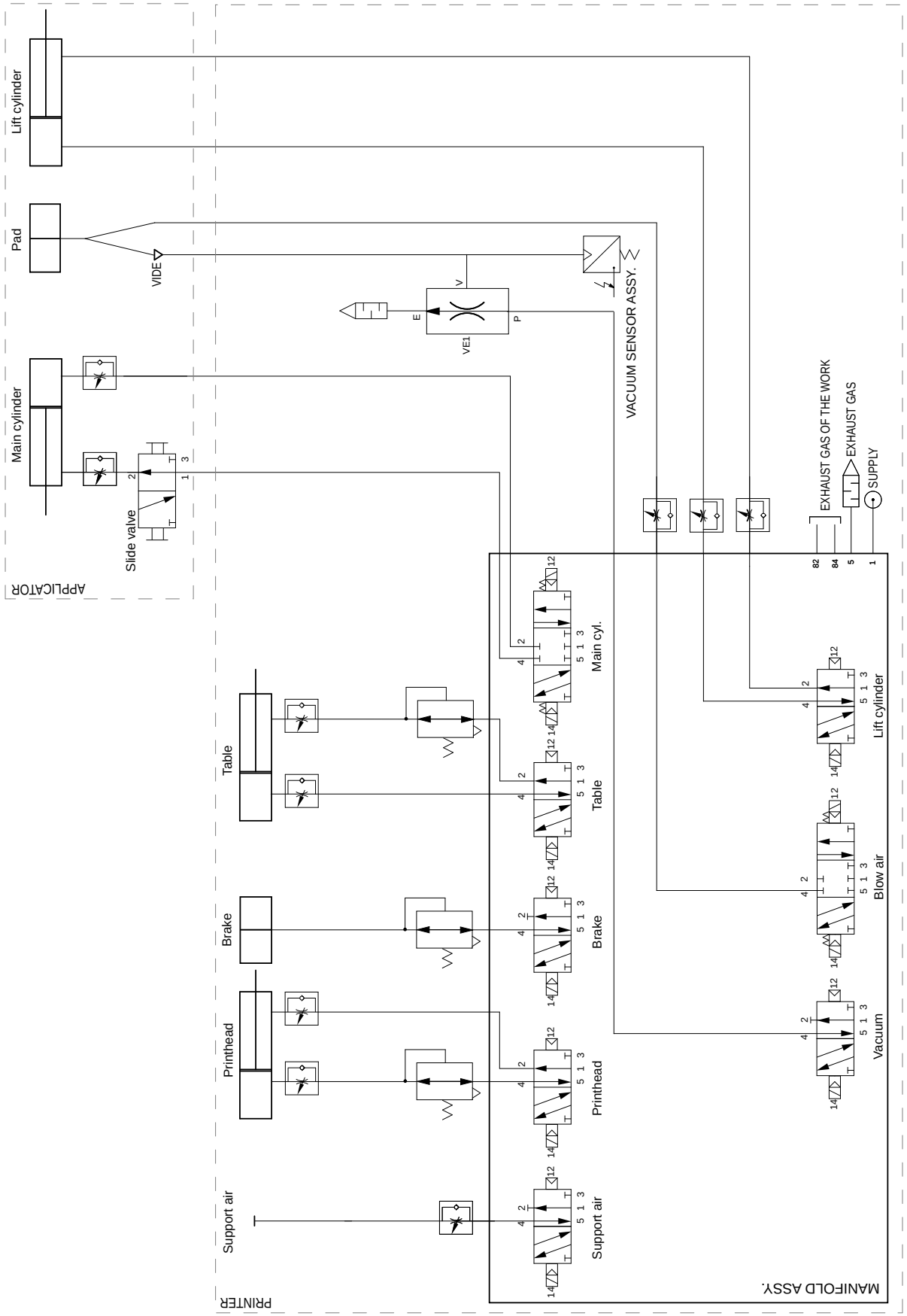


Appendix D: Pneumatic Diagrams

PAM 3600 with Applicator 3602



PAM 3600 with Applicator 3603



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